ASSOCIATED ENVIRONMENTAL GROUP, LLC

FINAL Feasibility Study Report

Conducted on:

Smitty's Conoco #140-Toppenish
(Former Spirit Gas Station)
102 East Toppenish Avenue
Toppenish, Washington 98948-1359
EPA ICIS ID: 1800041282
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1.0 INTRODUCTION AND BACKGROUND

1.1 Site Location and Regulatory Jurisdiction

1.1.1 Site Location

This report presents a Feasibility Study (FS) conducted by Associated Environmental Group, LLC (AEG) for the Smitty's Conoco #140 Toppenish, referred to as Smitty's Toppenish (Subject Site/Site). The Site has also been known as Toppenish Pik-A-Pop, Toppenish Smitty's Store #141, and is currently known as the Old Western Market. The Subject Site property is located at 102 East Toppenish Avenue, in Toppenish, Washington, Yakima County parcel number 20100334510 (Figure 1, *Vicinity Map*).

1.1.2 Regulatory Jurisdiction

The Site is currently owned by R.H. Smith Distributing Company, Inc. (R.H. Smith), and located on the reservation of the Confederated Tribes and Bands of the Yakama Nation in Central Washington. Appendix A, *Legal Description and Previous Owners*, contains a table showing the deed and sales history for the Site as was obtained online from the Yakima County Assessor's office.

Because the Site is located within the Yakama Nation reservation, the United States Environmental Protection Agency (EPA) has regulatory jurisdiction for implementing federal laws and regulations on this Site. While EPA has regulatory and oversight jurisdiction, it has decided, with the concurrence of the Yakama Nation, that the general investigation, remediation processes, and cleanup standards under the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) can be applied at this Site. EPA identifies the Subject Site as Smitty's Conoco #140 – Toppenish (Former Spirit Gas Station) with the following EPA Integrated Compliance Information System database (ICIS) number:

- ICIS ID: 1800041282

The Site is currently under an EPA "Administrative Order on Consent" with a docket number of "RCRA-10-2010-0136". The Administrative Order requires that R.H. Smith:

- *"Develop a Site Assessment Plan for the facility;*
- *"Submit… an approvable Corrective Action Plan ("CAP")… that will prevent or mitigate any migration of petroleum constituents released from the USTs formerly located at the facility;*
- *"Implement the approved CAP at the facility; and*
- *"Submit quarterly progress Reports"*.

This report is being prepared and submitted in partial fulfillment of that order.

1.2 Background

A Noll Environmental, Inc. report (July 2005) indicates that the Site may have been used as an automotive repair shop prior to 1974, but records substantiating this activity have not been obtained. The EPA Region 10 office records indicate that an 8,000-gallon gasoline fuel underground storage tank (UST) and a 6,000-gallon gasoline fuel UST were installed at the Site in 1974. A 4,000-gallon UST was installed in 1976.

Also, according to EPA records, the USTs were lined in 1998, and had cathodic protection installed in 2004. The EPA did not have records of, nor were they aware of, the existence of a 1,000-gallon UST and a 500-gallon UST encountered by AEG during soil excavation activities at the Site in November of 2009.

The service station building was converted into a convenience store in 1984, and the gasoline station ceased operations in November of 2009. Currently, the Site is occupied only by a convenience store and associated parking area.

2.0 PROPERTY DEVELOPMENT AND HISTORY

2.1 Facility Uses and Zoning

The Subject Site is currently zoned by Yakima County as "*Retail-Food*", and is used as a convenience store.

2.2 Historical Uses

According to historical references, the Site was utilized as an automotive service station and as a retail fueling station beginning in 1974, and remained a retail fueling station until fuel operations ceased in November of 2009. The former service station building was converted to a convenience store in 1984. Neighboring areas include commercial and retail development north, south, east, and west of the Site, with a city park directly west of the Site and the town's "Stock Yard" located southeast of the Site. (Figure 1, *Vicinity Map).*

2.3 Transportation/Roads

East Toppenish Avenue runs east to west directly north of the Site. To the west, southwest, and south of the Site is Asotin Avenue which runs northwest southeast. A City park owned by the Burlington Northern/Central Washington Railway is located to the west across Asotin Avenue. The railroad is located west of the park and runs north-south.

2.4 Utilities

Water and sewer for the Site are provided by the City of Toppenish and enters the Site from the north. The water main and sewer are located along Toppenish Avenue with the depth to the sewer being approximately six feet to seven feet below the ground surface (bgs). Gas is provided by Cascade Natural Gas and enters the Site from the south. Power to the Site is provided by Pacific Power and the power lines are located overhead. Storm water from the Site and in the area either goes to drywells or to the City sewer system.

2.5 Potential Sources of Site Contamination

The source for the contamination identified at the Site has been linked to a leaking product line. Other potential sources could include:

- Overfilling of the Site's USTs during fuel delivery;
- Spillage during vehicle fueling;
- Leaking from historical product lines; and
- Leaking and/or corroded UST's which have been removed.

3.0 NATURAL CONDITIONS

Based on the investigations conducted at the Site, the following natural conditions were observed:

3.1 Physiographic setting:

The City of Toppenish is situated within the Yakima River Basin along the western margin of the Columbia Plateau region and is adjacent to the eastern foothills of the Cascade Mountain Range (Cascades). The Yakima River Basin is bounded on the west by the Cascades, on the north by the Wenatchee Mountains, on the east by the Rattlesnake Hills, and on the south by the Horse Haven Hills.

While the headwaters of the Yakima River are based in the Cascades, much of the river basin is located in a semi-arid climate creating a large demand on river water and groundwater resources during summer months for agricultural irrigation. Annual precipitation in the area is approximately 8 inches per year. This is due to the rain shadow effect created by the mountains to the west (US Department of Interior, 2002).

Generally, there are three aquifer systems within the Yakima River Basin, including:

- A shallow aquifer composed of alluvium;
- A deeper, confined gravel aquifer called the Ellensburg aquifer; and
- A deep basalt bedrock comprised aquifer (USGS, 1987).

3.2 Site Geology and Hydrogeology

Subsurface conditions at the Subject Site, at locations of investigation, generally consist of alluvium deposits. These deposits general consist of brown, loose to medium dense silty sand, silty sand with gravel, very dense sandy gravel with local cobbles, and gray coarse clean sand to the maximum depth explored of 30 feet bgs. Boring logs from the soil borings and monitoring wells drilled/installed by AEG on-Site and off-property are attached in Appendix B, *Supporting Documents, Boring Logs 2010-2011; Boring Logs 2015.*

The direction of shallow groundwater appears to be primarily to the southeast, based on groundwater elevations measured at the Subject Site during AEG's March 2015 groundwater monitoring activities (Figure 2, *March 2015 Groundwater Contour Map*). Previous groundwater flow maps have shown a flow direction to the east with a southeasterly component near monitoring wells MW-9 and MW-10.

The direction of surface water flow follows the regional topography of the Yakima River Valley to the south and southeast. The Yakima River is located approximately 2 miles northeast of the Site. Based on water level measurements obtained at different times of the year, the water levels fluctuate approximately 1½ feet to 2 feet seasonally, with the highest water levels occurring during the summer months when irrigation is ongoing (Table 1, *Summary of Groundwater Elevations*).

4.0 PREVIOUS ENVIRONMENTAL INVESTIGATION/INTERIM ACTION SUMMARY

4.1 Phase II ESA Subsurface Assessment – June 2004

On June 14, 2004, DLH Environmental Consulting (DLH) conducted a Phase II Environmental Site Assessment (ESA) at the Site to determine if the subsurface soils and groundwater had been impacted by petroleum hydrocarbons from potential leaks in the UST system, and/or overfilling during fuel delivery. Results from five push-probe borings revealed:

- Elevated concentrations of gasoline-range total petroleum hydrocarbons (TPH) in soil above the MTCA Method A cleanup levels from samples collected at approximately 12 feet bgs, with concentrations up to 2,200 mg/kg.
- Gasoline associated VOCs, including benzene, toluene, ethylbenzene, and total xylenes (BTEX), were also present in the soil at concentrations above their respective MTCA cleanup levels.
- Diesel-range TPH was present in soil at concentrations below the MTCA Method A cleanup level.
- Lead was present in soil at concentrations below the MTCA cleanup level (DLH, 2004).
- Groundwater was encountered during the subsurface investigation at approximately 12 feet bgs.
- Groundwater samples indicated elevated concentrations of gasoline-range TPH exceeding Ecology's MTCA Method A cleanup level at 20,000 micrograms per liter (µg/l) and 23,000 µg/l.
- Diesel-range TPH concentrations above the MTCA Method A cleanup level ranging from 11,000 µg/l to 54,000 µg/l, were also detected in the groundwater.
- BTEX and naphthalene in the groundwater samples were present at concentrations exceeding their respective cleanup levels.
- Lead was detected in groundwater at a concentration exceeded its Ecology MTCA Method A cleanup level at 15.4 µg/l.

4.2 Monitoring Well Installation and Subsurface Media Sampling – 2005

In July of 2005, Noll Environmental, Inc. (NEI) installed three groundwater monitoring wells at the Site to a depth of approximately 19 feet bgs. Monitoring well MW-1 was installed in the southern portion of the Site adjacent to the convenience store. MW-2 was installed in the western portion of the Site near the intersection of East Toppenish Avenue and Asotin Avenue, and MW-3 was placed in the north-northeast portion of the Site adjacent to the eastern gasoline fuel dispenser island and East Toppenish Avenue (Figure 3, *Site Map*).

Analytical results of groundwater samples from the three monitoring wells indicated the presence of:

- Gasoline-range TPH (13,000 µg/l to 39,000 µg/l),
- Benzene (24 µg/l to 1,400 µg/l),
- Toluene (290 µg/l to 2,600 µg/l),
- Ethylbenzene (180 µg/l to 430 µg/l),
- Total xylenes (1,200 µg/l to 4,700 µg/l), and
- Total lead (18 µg/l).

These concentrations were all above their respective MTCA Method A cleanup levels for groundwater. Diesel-range TPH was not detected in the samples collected.

Based on surveyed data, groundwater elevations during the July 2005 sampling event indicated a southeasterly groundwater flow direction (NEI, 2005).

4.3 Proposed Corrective Action Plan – 2008

On October 3, 2008, White Shield, Inc. (WSI) submitted a proposed Corrective Action Plan (CAP) to R.H. Smith. The purpose of the CAP was to:

- Present WSI's plan to remediate the petroleum hydrocarbons contamination within the Site's subsurface, specifically soil and groundwater; and
- To serve as a report for two groundwater monitoring/sampling events completed at the Site (August of 2006 and October of 2007).

WSI proposed the installation of three additional groundwater monitoring wells at the Site and bioremediation via placement of Regenesis company's Oxygen Releasing Compound® (ORC®) socks in the wells onsite. ORC® is designed to accelerate the microbial degradation of petroleum hydrocarbons in the impacted vadose zone and groundwater.

In the proposed CAP, WSI reported the results from the August 2006 and October 2007 groundwater sampling. The results showed elevated concentrations of gasoline related petroleum products similar to previous results.

Groundwater contour maps, constructed based on depth to water measurements taken during these sampling events, indicated an easterly groundwater flow direction at the Site in August of 2006, and a southeasterly direction in October of 2007 (WSI, 2008).

4.4 Helium Tank Tightness Testing – May 2009

On May 18, 2009, Northwest Tank and Environmental Services, Inc. was retained by R.H. Smith to conduct a helium test on the Site's USTs and associated product lines. The helium test indicated that a release point existed in the vicinity of the southern dispenser of the eastern dispenser island (Fig. 3).

4.5 AEG Initial Site Work – August 2009/September 2009

On August 16, 2009, AEG conducted an initial site reconnaissance at the Site. During this visit, AEG collected soil samples adjacent to the two pumps on the eastern-most fuel dispensing island, pump #1/2 and pump #3/4. Soil samples (SB-1 through SB-3) were collected at four feet bgs via a hand auger. Laboratory analytical results indicated no detectable concentrations of gasoline range TPH or gasoline associated VOCs, including BTEX.

On September 2, 2009, AEG conducted groundwater monitoring/sampling in monitoring wells MW-1 through MW-3 (Figure 3, *Site Map*). Concentrations of gasoline related petroleum products were detected at concentrations above their respective MTCA Method A cleanup levels in monitoring wells MW-1 and MW-3 (Table 2, *Summary of Groundwater Analytical Results*).

Based on the elevated concentrations of gasoline-range TPH and VOCs detected in groundwater during AEG's sampling event and former sampling events completed by WSI, R.H. Smith directed AEG to supervise the removal of the fuel dispenser islands and expose the product lines to visually inspect their integrity and connections to the UST system.

On September 26, 2009, AEG collected soil samples adjacent to the dispenser sumps for fuel dispensers #1/2 and #3/4 on the eastern most dispenser island, at a depth of approximately one-foot bgs. The laboratory analytical results indicated concentrations of gasoline related petroleum products above their respective MTCA Method A soil cleanup levels.

Based on these results and subsequent correspondences with EPA, AEG recommended decommissioning and removal of the three fuel USTs and associated product lines at the Site.

4.6 EPA Groundwater Sampling Event – October 2009

In October of 2009, EPA representatives conducted a groundwater-sampling event and submitted three groundwater samples for analysis of VOCs via EPA Method 8260C. VOC concentrations in groundwater during this event were comparable to previous groundwater monitoring/sampling events conducted by AEG and WSI (EPA, 2009).

4.7 Interim Remedial Action (UST Decommissioning) – November 2009

From November 9, 2009, through November 20, 2009, AEG, along with subcontractor Belsaas & Smith Construction (Belsaas), completed decommissioning and removal of:

- One 8,000-gallon gasoline fuel UST;
- One 6,000-gallon gasoline fuel UST;
- One 4,000-gallon diesel fuel UST;
- One 1,000-gallon UST; and
- One 500-gallon waste oil UST.

Two of the tanks had not been previously identified at the Site. The 1,000-gallon UST had been closed-in-place by being filled with Controlled Density Fill (CDF), and the fill port on the 500-gallon UST had been removed. The 500-gallon UST also contained approximately 300 gallons of waste oil. All of the USTs appeared to be slightly corroded; however, no obvious holes were found in any of the tanks.

Petroleum-contaminated soil (PCS) was encountered in the overburden soil around the fill ports of the 4,000-gallon, 6,000-gallon, and 8,000-gallon USTs, near the turbines, and beneath the USTs, to a depth of approximately 12 feet bgs where groundwater was encountered. A total of 1,535 tons of PCS was excavated and removed from the Site.

Soil samples collected from the sidewalls and base of the excavation revealed that TPH contamination remained above the MTCA Method A cleanup level in both the sidewalls and base of the excavation. The TPH contamination ranged from:

- Non-detect to 14,600 mg/kg in the northern sidewall of the excavation;
- 4,320 mg/kg to 6,390 mg/kg in the western sidewall of the excavation;
- Non-detect to 5,070 in the southwestern sidewall of the excavation;
- Non detect in the southern sidewall;
- Non-detect to 7,170 mg/kg in the eastern sidewall; and
- 46 mg/kg to 18,500 mg/kg in the base of the excavation.

Excavation was limited horizontally by the City of Toppenish's rights-of-way and by the building on the Site, and vertically by the presence of groundwater. Monitoring wells MW-2 and MW-3, located in the western and northeastern areas of the Site, were removed during soil excavation activities.

4.8 Administrative Order on Consent (Docket No. RCRA-10-2010-0136) – April 2010

On April 19, 2010, R.H. Smith and the Environmental Protection Agency (EPA) entered into an agreed order referred to as an "Administrative Order on Consent" which required R.H. Smith to:

- *"Develop a Site Assessment Plan for the facility;*
- *"Submit an approvable Corrective Action Plan (CAP) that will prevent or mitigate any migration of petroleum constituents released from the USTs formerly located at the Site;*
- *"Implement the approved CAP at the facility; and*
- *"Submit Quarterly Progress Reports*."

The Order was modified on March 14, 2011, to change the schedule for the work to be performed. The work described below was performed pursuant to the Order.

4.9 AEG Off Property Preliminary Investigation – July 2010

AEG conducted off property characterization of the dissolved phase petroleum hydrocarbons plume associated with the Site in July of 2010. Twelve borings were advanced to a maximum depth of 15 feet bgs via a direct-push probe drilling rig at locations of environmental concern inferred to be downgradient, cross-gradient, and adjacent to the Subject Site property (Figure 4, *Off Property Push Probe Boring Locations*).

Based on the soil and groundwater analytical results from this investigation, it was determined that the dissolved phase plume had impacted areas at least 300 feet east of the Site towards B Street, located one block from the Subject Site property. Areas south and southeast of the Subject Site property did not appear adversely impacted based on findings from borings advanced in these areas. Table 3, *Summary of Soil Analytical Results - Off Property Soil Borings*, and Table 4, *Summary of Off Property Borings - Groundwater Analytical Data* present the results of the analyses.

4.10 AEG Supplemental Remedial Investigation – January and February 2011

In January and February of 2011, AEG conducted a Supplemental Remedial Investigation to further characterize the lateral and vertical extent of the dissolved phase gasoline-range petroleum hydrocarbons in off property areas downgradient and cross-gradient of the Site. Seven soil borings subsequently converted to 2-inch diameter groundwater monitoring wells (MW-4 through MW-10) were advanced to a depth of approximately 25 feet bgs (Figure 3, *Site Map*). The newly installed monitoring wells included the following locations:

- Southeast of the Subject Site property on Asotin Avenue (well MW-6);
- To the east of the Subject Site property on El Charrito restaurant property (wells MW-5, and MW-7);

- To the east of the El Charrito property (wells MW-9, and MW-10);
- East Toppenish Avenue right-of-way (well MW-8); and
- Adjacent to the Subject Site property to the west in City's right-of-way on Asotin Avenue (well MW-4).

Findings from the Preliminary (off property) and the Supplemental RI confirmed that:

> *"…soil remedial activities during the UST decommissioning and product lines removal have eliminated the bulk of petroleum contaminated soil at the Site; however, residual PCS remains at depths greater than 10 feet bgs, and will continue to serve as a source of residual contamination to groundwater" (AEG, 2011).*
>
> *"…the lateral extent of the dissolved phase petroleum hydrocarbons extends from the west area of the property (in the vicinity of the previous USTs) to off-property areas to the east of the facility, including the adjoining El Charrito restaurant property, and B Street. However, based on the lack of detectable concentrations of these analytes in the February 2011 quarterly groundwater sampling event, it appears that diesel-range TPH and halogenated volatile organic compounds (VOCs) are not constituents of concern associated with the Site" (AEG, 2011).*

4.11 Second Phase Interim Remedial Action – 2012

In December of 2011, and March of 2012, AEG performed a "Second Phase Interim Remedial Action (IRA)" at the Site. The Second Phase IRA was to continue remediation of the soil and groundwater at the Site, following the removal and excavation of PCS during the UST decommissioning. This was to be accomplished using "in-situ chemical oxidation" (ISCO) and enhancing any aerobic bioremediation through the addition of oxygen into the subsurface. The ICSO was accomplished using Regenesis company's RegenOx® product, and the enhanced aerobic bioremediation was accomplished using Regenesis' Oxygen Releasing Compound–Advanced® formula (ORC-A®) product.

4.11.1 In-situ Chemical Oxidation

From December 5, 2011, through December 10, 2011, AEG injected 4,590 pounds of Regenesis company's RegenOx® product through 24 injection points (Figure 5, *RegenOx® Injection Points*) at depths of approximately 4 feet to 15 feet bgs, to in-situ chemically oxidize the contaminants within the affected shallow soil and lower smear zone. The RegenOx® was used to reduce sorbed and soil-matrix bound petroleum hydrocarbon in the vadose zone and saturated zone, as well as in the dissolved phase in groundwater.

4.11.2 Enhanced Aerobic Bioremediation

To further assist the microbial degradation of remaining petroleum hydrocarbons in the impacted vadose zone and groundwater, a secondary stage of in-situ treatment was conducted at the Site in March of 2012 (three months after the initial stage of RegenOx® treatment). Approximately 1,400 pounds of Regenesis' Oxygen Releasing Compound-Advanced (ORC-A®) was injected. (Figure 6, *ORC-A® Injection Points*). ORC-A® was injected throughout the Site and adjacent/nearby downgradient areas at depths of 4 feet to 15 feet bgs, and at lateral intervals of approximately 10 feet to 20 feet. Three angled injections were completed on the north, south, and west side of the building at the Site at depths of approximately 7 feet to 18 feet bgs.

4.12 Post-ORC-A® Quarterly Groundwater Monitoring – 2012 to present

Following the treatment with ORC-A®, AEG began conducting quarterly groundwater monitoring at the Site. Table 2, Summary of Groundwater Monitoring Analytical Data, presents the results of the quarterly groundwater monitoring. This monitoring has shown that:

- Both the RegenOx® and ORC-A® appear to have caused the contaminant plume to stabilize migration of contaminants in the downgradient direction while the RegenOx® and ORC-A® were active; and
- The concentrations of the contaminants have significantly decreased but remain significantly above the MTCA Method A cleanup levels.
- As the groundwater elevation decreases, the concentration of TPH increases (Figure 7, Gasoline-*Range TPH and Groundwater vs Time*).

4.13 Supplemental Site Characterization - February 2015

Based on the results of the groundwater monitoring, EPA and AEG concurred that additional characterization of the Site was needed to better define the location of the contaminants in the soil and groundwater, both on the Subject Site property and in offsite locations in the immediate vicinity. This additional characterization allows for better determination of the remedial action alternatives at the Site, as well as for a better engineering design for those activities.

In partial fulfillment of the "Administrative Order on Consent", AEG submitted a *Supplemental Site Characterization Work Plan* on October 17, 2014, for review and comment. Comments from Mr. Robert Rau at EPA were received on November 5, 2014, and addressed in a *Revised Supplemental Site Characterization Work Plan* submitted on November 25, 2014.

On February 12, 2015, AEG completed the additional subsurface investigation. The objectives of the work was:

- To explore the extent of contamination beneath the building;
- To explore potential upgradient sources north and northwest of the Site; and

- To define the extent of contamination of known areas exceeding their respective MTCA Method A cleanup levels.

To accomplish the objectives, AEG completed six soil borings, drilled and installed seven monitoring wells (Figure 3, *Site Map*). This work is described in detail in a report entitled "*Supplemental Site Characterization Report (Revised Draft of May 15, 2015 Report)*" and dated July 15, 2015.

Based on the results of the samples collected (Table 5, *Summary of Soil Analytical Results SSC February 2015*) and observations made during the investigation, AEG concluded that:

- The contaminants of concern appear to still remain under the current building, with the highest concentrations of gasoline-range TPH beneath the western portion of the building;
- The contamination in soils and groundwater found in the western portion of the Subject Site property and beneath the building appears to be a result of contamination left in place after the excavation of the USTs and associated PCS in 2009;
- The highest concentrations of contaminants in the soil appear to be directly west of the building, cross and downgradient of the former pump islands (Figure 8, *Soil Contamination Concentration Map – TPH-Gas*)
- The highest concentrations of gasoline-range TPH in groundwater appear to be near MW-4 and MR-7 (Figure 9, *Groundwater Contamination Concentration Map – TPH-Gas).*
- The contamination found in well MW-7 appears to attenuate before reaching well MW-16 and is not present in well MW-10;
- Based on newly installed upgradient groundwater-monitoring wells, there does not appear to be an off-site source for contamination found in well MW-4;
- It appears that there may have been migration of the contamination to the west toward well MW-17. It is not known how the contamination observed in the soil sample from a depth of 10 and 20 feet bgs migrated to the area near monitoring well MW-17. The contamination is comprised of gasoline-range TPH in the soil with the highest concentration, 62 mg/kg, at a depth of 10 bgs. This could be from infiltration of storm water from the surface or storm water migrating though the unsaturated zone before or during the excavation at the Site. The analyses of groundwater samples from the monitoring well (well MW-17) have not detected any of the constituents of concern from the Site ; and
- Characterization at the Site is complete and that a feasibility study could be prepared.

5.0 CONTAMINANT OCCURANCE AND MOVEMENT

Based on AEG's investigations, the soil and groundwater at the Site are contaminated with gasoline-range TPH and BTEX compounds, with the known source being leaking product lines at the Site. Minor amounts of diesel-range TPH are also present beneath the building on the Site. It appears the contamination is primarily located between 11 feet to 25 feet bgs at the Site in a zone of course sandy gravel and cobbles that lies below a silty sand to sandy silt layer that occurs from the surface to approximately 6 feet to 10 feet bgs. Visual observations and samples of soil collected from the monitoring well borings and boring B-13 indicate that the contamination does not appear to extend below 25 feet bgs.

At approximately 25 feet bgs in boring B-13 and well MW-16, there is a sand layer which is interpreted to exist beneath the entire site. This sand layer may contain a higher silt percentage than was observed because of the drilling method used, which makes it difficult to determine the silt contents in sands and gravel.

The maximum extent of the soil contamination at the Site is shown in Figure 8, *Soil Contamination – TPH-Gas.* The majority of these impacts occur at or below the water table.

The primary migration direction of the contamination in groundwater appears to be to the east-southeast. Figure 9, *Groundwater Contamination Concentration Map – TPH-Gas*, and Figure 10, *Groundwater Contamination Concentration Map – Benzene*, shows the current extent of groundwater contamination. These figures represent the updated information from the February 2015, Supplemental Site Characterization.

6.0 CONCEPTUAL MODEL

This section provides a conceptual understanding of the Site derived from the results of the subsurface investigations and previous remedial actions performed at the Site. This Conceptual Site Model (CSM) is limited to release from the leaking product lines at the Site and will assist in determining the best remedial approach for the Site. The CSM is dynamic and may be refined as additional information becomes available. A summary of the CSM is presented in Figure 11, *Conceptual Site Model*.

6.1 Constituents of Concern and Affected Media

Soil, groundwater, and air are media at the Site that have been, or could potentially be, affected by the constituents of concern (COCs) identified at the Site. The COCs at this Site are primarily gasoline-range TPH and BTEX compounds, with a secondary component of diesel-range TPH. The soil and groundwater contamination present at the Site is a result of leaking product lines with the exact timeframe of the release being unknown. It is assumed that the release occurred before 2005, and continued until the UST system was decommissioned in 2009. The volume of product released is not known.

Based on the depth of the soil contamination observed and its location downgradient from the source area, it is thought that the deeper and downgradient soil contamination is a result of migration of the gasoline with the groundwater away from the release location. This migration most likely included advective transport as well as dispersion and diffusion in the soil and groundwater. Lastly, it is likely that soil vapor impacts exist within the vadose zone due to volatilization of the gasoline-range TPH and BTEX in soil and groundwater.

6.2 Environmental Fate of TPH and BTEX in the Subsurface

TPH and BTEX compounds are soluble in groundwater and will migrate with the water. Benzene is the most soluble component and will migrate faster than the rest of the BTEX compounds. It may migrate farther and, if present, be used as an indicator parameter for the contamination.

Gasoline-range TPH and BTEX compounds are also volatile and can be volatilized under the appropriate conditions. In the subsurface, this volatilization releases COCs into the soil vapor where, if conditions are right, it can migrate beneath or into structures. As the more soluble and more volatile components of the gasoline-range TPH are either dissolved or volatilized, the heavier components of the TPH remain in the soil. These degraded components are less volatile, and less likely to impact soil vapors.

TPH and BTEX compounds are also readily biodegraded in the subsurface by naturally occurring aerobic and anaerobic bacteria. The aerobic biodegradation is the most efficient of the biological

activities and is the basis for a Monitored Natural Attenuation remedial action at gasoline-contaminated sites.

6.3 Potential Exposure Pathways

The Ecology MTCA regulations has a good definition for exposure pathway that is also applicable to sites under EPA jurisdiction. WAC 173-340-200 states that:

> *"…An exposure pathway describes the path a hazardous substance takes or could take from a source to an exposed organism. An exposure pathway describes the mechanism by which an individual or population is exposed or has the potential to be exposed to hazardous substances at or originating from a site…"*

6.3.1 Potential Soil Exposure Pathways

Direct ingestion of, or dermal contact with, soil containing TPH and BTEX is considered a potential exposure pathway. Also, inhalation of soil vapor is considered a potential exposure pathway. The soil in the area near the leaking product lines and under the convenience store building have the highest concentrations of the COCs. Currently, this area is covered by asphalt and the building, which would preclude stormwater runoff, erosion, or wind as a transport mechanism. Only construction/utility workers are likely to be exposed if the area were disturbed.

6.3.2 Potential Groundwater Exposure Pathways

Direct contact and ingestion of groundwater containing TPH and BTEX is considered a potential exposure pathway. Although the groundwater in the area of the Site is not currently used for drinking water, it is considered a potential future source of drinking water for the purposes of establishing cleanup levels for this Site. Further, there is potential for direct contact for construction/utility workers because of the shallow depth of its occurrence. Lastly, inhalation of vapors produced through volatilization of gasoline-range TPH and BTEX in the groundwater through the soil column is considered a potential exposure pathway. There are no surface water bodies in proximity to the Site that would be expected to be impacted via groundwater-to-surface water migration.

6.3.3 Potential Air Exposure Pathways

Both soil and groundwater beneath the Site are impacted with gasoline-range TPH and BTEX, which have the potential to volatize and create a potential exposure pathway via inhalation. Vapors generated via impacts to soil and groundwater have the potential to migrate through the subsurface and into nearby structures. No residences are located within 100 feet of soil and/or groundwater impacts, and are not likely to be exposed. However, commercial/retail/restaurant workers within the on-Site and nearby structures have the potential to be exposed. Specifically, the primary buildings that have the potential to be affected by vapor intrusion would include the convenience store building and the restaurant building to the east, both of which are located within areas of

impacted soil and/or groundwater. To a lesser extent, other buildings located within 100 feet of soil and/or groundwater impacts include the commercial buildings south of the restaurant, and northeast and northwest of the convenience store across East Toppenish Avenue.

Exposure to outside ambient air impacts are less likely given the presence of asphalt and buildings covering much of the ground surface, as well as the presence of natural ventilation that goes with being outside.

6.3.4 Potential Receptors

Potential human exposure to TPH and BTEX in the soil, groundwater, and air is considered a risk to human receptors, including employees, construction/utility workers, customers, and trespassers, who may be exposed to soil, groundwater, and air at the Site.

The majority of the Site is covered by asphalt paving or buildings, and it is not anticipated that ecological receptors would be at risk. Further, there is currently less than 1.5 acres of contiguous undeveloped land on or within 500 feet of any area of the Site, which would exclude the Site from further terrestrial ecological evaluation under MTCA.

7.0 CLEANUP STANDARDS

The following sections identify remedial action objectives and preliminary cleanup standards for the Site, which were developed to address EPA's requirements for cleanup. These requirements address conditions relative to potential human receptor impacts. Together, the remedial action objectives and cleanup standards provide the framework for evaluating remedial alternatives.

7.1 Remedial Action Objectives

The primary objective for a cleanup action focuses on substantially eliminating, reducing, and/or controlling unacceptable risks to human health and the environment posed by the COCs, to the greatest extent practicable.

7.2 Cleanup Standards

Because this Site is under EPA oversight, federal cleanup requirements are applicable. However, EPA has agreed to use the cleanup standards developed under the Washington State Department of Ecology's MTCA regulations. The cleanup standards include cleanup levels and points of compliance (POCs). Cleanup standards must also incorporate other federal regulatory requirements as applicable.

7.2.1 Cleanup Levels

MTCA Method A cleanup levels for soil and groundwater will be used for this Site. These cleanup levels are based on the most stringent values for each exposure pathway, and are considered appropriate for the Site COCs. The MTCA Method A cleanup levels for the Site COCs are:

Soil:	TPH-Gasoline	30 mg/kg
	Benzene	0.03 mg/kg
	Toluene	7 mg/kg
	Ethylbenzene	6 mg/kg
	Total Xylenes	9 mg/kg
	TPH-Diesel	2,000 mg/kg
Groundwater:	TPH-Gasoline	800 µg/L
	Benzene	5 µg/L
	Toluene	1,000 µg/L
	Ethylbenzene	700 µg/L
	Total Xylenes	1,000 µg/L
	TPH-Diesel	500 µg/L

7.2.2 Point of Compliance

For this Site, it is assumed that the standard POC will be applied.

- Soil – Direct Contact: For soil cleanup levels based on human exposure via direct contact, the POC is throughout the Site from the ground surface to 15 feet bgs.
- Soil – Leaching: For soil cleanup levels based on protection of groundwater, the POC is throughout the Site.
- Groundwater: For groundwater, the POC is throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth that could potentially be affected by the Site.
- Indoor Air/Soil Gas: The POC is ambient and indoor air throughout the Site.

8.0 AREAS REQUIRING CLEANUP

The highest concentrations of contaminants remaining in the soil, following the November 2009 excavation, appear to be directly west of the building, and cross and downgradient of the former pump islands, as shown in Figure 8, *Soil Contamination Concentration Map - TPH-Gas*. The majority of these impacts occur at or below the water table.

The highest concentrations of gasoline-range TPH and benzene in groundwater appear to be near MW-4 and MW-7 as shown in Figure 9, *Groundwater Contamination Concentration Map - TPH-Gas*, and Figure 10, *Groundwater Contamination Concentration Map - Benzene*.

Based on the distribution of contaminants, it appears that the remaining contamination requiring cleanup is located within the base and sidewalls of the former excavation limits, within the saturated zone, and within the smear zone of the groundwater plume.

9.0 OBJECTIVES

Because EPA has decided that the general investigation and remediation processes, and cleanup standards under the Washington State Department of Ecology (Ecology) Model Toxic Control Act (MTCA) can be applied at this site, the objectives identified here meet the substantive requirements of MTCA and will satisfy EPA's requirements. According to the MCTA regulations:

> *"…The purpose of a remedial investigation/feasibility study is to collect, develop, and evaluate sufficient information regarding a site to select a cleanup action under WAC 173-340-360 through 173-340-390…" (Chapter 173-340-350(1) WAC)*

The objective of this Feasibility Study is to determine the feasibility of various remedial options for the Site. Based on results from previous investigations, it is AEG's opinion that the Site is characterized both laterally and vertically to a point where a cleanup action can be proposed. Therefore, a preferred Remedial Alternative is recommended based on the results of the feasibility study.

9.1 Cleanup Objectives

The cleanup objectives for this Site are to:

- Protect human health and the environment;
- Comply with cleanup standards;
- Comply with applicable laws;
- Provide for compliance monitoring;
- Provide a reasonable restoration time-frame;
- Use permanent solutions to the maximum extent practicable;
- Consider public concerns;
- Achieve source control; and
- Achieve a "No Further Action" (NFA) determination.

9.2 Relevant and Appropriate Requirements

Both the Ecology MTCA Regulations and EPA require that cleanup actions comply with applicable state and federal laws. Because the Subject Site is located on the reservation of the Yakama Nation, some State regulations may not be applied at the Site, and may be superseded by the Federal equivalent, if one exists. However, EPA has indicated that the MTCA regulations will be used as guidance. MTCA defines applicable state and federal laws to include *"legally applicable requirements"* and *"relevant and appropriate requirements"* (ARARS). ARARS for the implementation of the cleanup action at this Subject Site follow.

9.2.1 Federal Requirements

- Clean Water Act
- Clean Air Act
- Resource Conservation and Recovery Act (RCRA)
- Occupational Safety and Health Act (29 CFR 1910)
- Safe Drinking Water Act
- Rules for Transport of Hazardous Waste (49 CFR 107, 49 CFR 171)

9.2.2 State Requirements

- Model Toxics Control Act Regulations (WAC 173-340)
- Dangerous Waste Regulations (WAC 173-303)
- Minimum Standards for Construction and Maintenance of Wells (WAC 173-160)
- Regulation and Licensing of Well Contractors and Operators (WAC 173-162)
- State Clean Air Act, Chapter 70.94 RCW
- Washington Industrial Safety and Health Act Regulations (WAC 296-62)
- Water Pollution Control Act, Chapter 90.48RCW
- Water Quality Standards for Surface Waters of the State of Washington (WAC173-201A)
- Water Quality Standards for Groundwater of the State of Washington (WAC 173-200)
- Underground Injection Control (WAC 173-218)
- Maximum Environmental Noise Levels (WAC 173-60)
- State Environmental Policy Act (Chapter 43.21C RCW)

9.2.3 Local Requirements

- All required local permits to implement the chosen Remedial Action will be obtained according to the City of Toppenish requirements. These permits could include, but are not limited to; construction, air quality, building or right-of-way use.

10.0 REMEDIAL ALTERNATIVES CONSIDERED

Using the cleanup objectives described above several remedial technologies were evaluated to produce a short list for further evaluation. The cleanup alternatives selected for further evaluation at the Smitty's Conoco #140 Toppenish Site are:

- **Alternative #1** – In-Situ Chemical Oxidation (ISCO) using the Regenesis company's RegenOx® reagents followed by enhanced bioremediation using an oxygen releasing compound (Regenesis company's Oxygen Releasing Compound – Advanced (ORC-A®));
- **Alternative #2** – In-Situ Chemical Oxidation (ISCO) using Ozone
- **Alternative #3** – Air Sparging/Soil Vapor Extraction
- **Alternative #4** – In-Situ Heat-Enhanced Bioremediation

Each of these technologies are described below, along with a discussion of how the technology would be applied at the Subject Site.

10.1 Alternative #1 – In-Situ Chemical Oxidation (ISCO) using RegenOx® and Enhanced Biodegradation using an Oxygen Releasing Compound

10.1.1 In-situ chemical oxidation

In-situ chemical oxidation (ISCO) involves the injection or direct mixing of reactive chemical oxidants into groundwater and soil for the primary purpose of rapid and complete contaminant destruction. ISCO is a versatile treatment technology that is most often deployed in source zones characterized by moderate to high contaminant concentrations in groundwater, significant sorbed contamination, and the potential presence of residual, separate-phase contamination (LNAPL or DNAPL droplets or ribbons).

Part of Alternative 1 at the Smitty's Conoco #140 Toppenish Site would involve injecting Regenesis company's RegenOx® reagents into the subsurface at the Site. According to Regenesis[1]:

> *"…RegenOx® in situ chemical oxidation (ISCO) directly oxidizes contaminants … and effectively destroy{s} a range of target contaminants including both petroleum hydrocarbons and chlorinated compounds. RegenOx® is an injectable, two-part ISCO reagent that combines a solid sodium percarbonate based alkaline oxidant (Part A), with a liquid mixture of sodium silicates, silica gel and ferrous sulfate resulting in a powerful contaminant destroying technology.*

[1] RegenOx® and ORC® product information provided by Regenesis (www.regenesis.com).

> *"Once emplaced in the subsurface, RegenOx® produces a cascade of highly-efficient chemical oxidation reactions…"*
>
> *"These reactions destroy a range of contaminants and can be propagated in the presence of RegenOx® for periods of up to 30 days on a single injection."*

RegenOx® would be injected in two areas of the Site. Area 1 would be between well MW-4 and the current building at the Site, extending from Toppenish Avenue in the north to approximately well MW-1. The second area (Area 2) is located between the building on the Site and the restaurant to the east. The northern extent of this area would be Toppenish Avenue and the southern extent would be near the location of Boring B-13. According to Regenesis, up to four injections would be needed in Area 1, and two injections in Area 2. This treatment would then be followed up with enhanced aerobic biodegradation.

10.1.2 Enhanced Aerobic Biodegradation

Biodegradation/Bioremediation is defined as use of biological processes to degrade, break down, transform, and/or essentially remove contaminants or impairments of quality from soil and water. Biodegradation/Bioremediation is a natural process which relies on bacteria, fungi, and plants to alter contaminants as these organisms carry out their normal life functions. Metabolic processes of these organisms are capable of using chemical contaminants as an energy source, rendering the contaminants harmless or less toxic products in most cases.

Enhanced aerobic biodegradation is the practice of adding oxygen to saturated soil and groundwater to increase the number and vitality of indigenous microorganisms able to perform biodegradation.

Oxygen is the primary growth-limiting factor for hydrocarbon degrading bacteria. Natural sources of dissolved oxygen are quickly depleted when petroleum hydrocarbons are released into the subsurface, thus the natural attenuation of petroleum hydrocarbons in untreated, oxygen-depleted aquifers is slow. By providing oxygen into the subsurface, the naturally occurring aerobic biodegradation rates can accelerated 10-100 times.

Enhanced aerobic biodegradation is typically used to treat low to moderate levels of contamination. The most commonly treated compounds treated with enhanced aerobic bioremediation are petroleum hydrocarbon constituents (BTEX, PAHs, and TPH).

For this Site, Regenesis company's Oxygen Release Compound–Advanced® (ORC-A®) would be used to release oxygen into the subsurface to accelerate the microbial degradation of any remaining petroleum hydrocarbons left in the saturated soil and groundwater after the In-situ Chemical Oxidation with RegenOx®. According to Regenesis, ORC-A® is a:

> *"…calcium oxy-hydroxide that provides controlled-release molecular oxygen to the subsurface environment where it will accelerate the rate of naturally occurring aerobic contaminant biodegradation in groundwater and saturated soils for up to 12 months upon hydration…"*

As with the RegenOx® ISCO, the ORC-A® would be injected in two areas of the Site. These are correspond to the same areas as the RegenOx®. The ORC-A® would be injected with the final application of the RegenOx®. Following application of the ORC-A®, the groundwater at the Site would need to be monitored on a quarterly basis until the cleanup levels have been achieved for a minimum of eight consecutive quarters.

10.2 Alternative #2 – In-Situ Chemical Oxidation (ISCO) using Ozone

In general, ozone based processes for site remediation are similar to other chemical oxidation techniques in that the oxidant of choice is injected into the desired treatment area. However, the use of ozone is different from most oxidation processes as the ozone can be injected as a gas or liquid (ozonated water). Ozone (O_3) is an allotrope of oxygen, consisting of three oxygen atoms that are less stable than diatomic oxygen (O_2). Ozone is more soluble than oxygen in water and has been used for decades in municipal water treatment applications for disinfectant purposes.

Injecting as a gas or liquid provides the opportunity to deliver more continuous oxidation as opposed to batch applications typically associated with other techniques. Ozone destroys organic chemicals through the process of chemical oxidation which breaks the targeted organic chemical down into innocuous by-products of carbon dioxide and water.

The ozone is produced onsite from ambient air which is passed through an oxygen concentrator. The ozone is then delivered as concentrated ozone gas or liquid into the subsurface below the water table or into the vadose zone through sparge points. The locations of the sparge points are based on the determination of a radius of influence which is dependent on subsurface lithology at the Site.

Ozone is extremely effective in treating many groundwater pollutants, including:

- Total Petroleum Hydrocarbons (TPH)
- Benzene, toluene, ethylbenzene and xylenes (BTEX)
- Methyl tert-butyl ether (MTBE)
- Tert-Butyl Alcohol (TBA)

The introduction of concentrated oxygen into the subsurface also aids in the increase of biodegradation by injecting the oxygen that the native microbes in the soil require in order to naturally break down the contaminants of concern to further enhance the cleanup.

For this Site, ozone would be injected throughout the Site through specially designed installation points.

10.3 Alternative #3 – Air Sparging/Soil Vapor Extraction (AS/SVE)

AS/SVE is an in-situ remedial technology that reduces concentrations of volatile constituents that are adsorbed to soils and dissolved in groundwater. This technology is also known as "in-situ air stripping" and "in-situ volatilization". It involves the injection of contaminant-free air into the subsurface saturated zone, enabling a phase transfer of VOCs from a dissolved state to a vapor phase. The air is then vented through the unsaturated zone.

AS is most often used together with SVE. When AS is combined with SVE, the SVE system creates a negative pressure in the unsaturated zone through a series of extraction wells, to control the vapor plume migration and collect the vapors for treatment before being discharged.

When used appropriately, AS has been found to be effective in reducing concentrations of volatile organic compounds. It works best in permeable, homogenous soil. In tighter, heterogeneous soil, potential creation of preferential pathways could leave pockets of soil and groundwater untreated.

10.4 Alternative #4 – In Situ Heat-Enhanced Bioremediation

As previously discussed, biodegradation/bioremediation is a natural process that relies on bacteria, fungi, and plants to alter contaminants as these organisms carry out their normal life functions. Metabolic processes of these organisms are capable of using chemical contaminants as an energy source, rendering the contaminants harmless or less toxic products in most cases.

Temperature influences the rate of biodegradation by controlling the rate of enzymatic reactions within microorganisms. Generally, "*…speed of enzymatic reactions in the cell approximately doubles for each 10º C* [degrees Celsius (50 degrees Fahrenheit (º F)] *rise in temperature…*" (Nester et al., 2001).

There is an upper limit to the temperature that microorganisms can withstand. Most bacteria found in soil, including many bacteria that degrade petroleum hydrocarbons, have an optimum temperature ranging from 25º C (77º F) to 45º C (113º F) (Nester et al., 2001). Thermophilic bacteria (those that survive and thrive at relatively high temperatures), which are normally found in hot springs and compost heaps, exist indigenously in cool soil environments and can be activated to degrade hydrocarbons with an increase in temperature to 60º C (140º F).

For the Toppenish Site, thermally enhanced bioremediation/biodegradation would use the "*Dissolved Oxygen In-Situ Treatment (DO-IT^{TM}) system*". This system utilizes extracted groundwater as a carrier for high levels of dissolved oxygen (>35 parts per million) and biological enhancements. The DO-IT^{TM} system recovers groundwater from the contaminant plume area and downgradient of the plume. Oxygen is added to the water by using small amounts of peroxide or ozone and then oxygenated treatment water is re-distributed to the subsurface to support high rates of in-situ microbial degradation. In this way, the bioremediation methods can work efficiently to degrade TPH/BTEX, while also facilitating hydraulic control and capture of the contaminant plume.

The system will be coupled with a boiler and a heat exchanger to take the extracted groundwater and heat it to 90^{o} F prior to re-injection into the injection wells. It is expected that the groundwater in the treatment zone will increase in temperature by 10 to 30^{o} F. This increased temperature will enhance desorption, increase solubility, and increase biodegradation rates by an order of magnitude, resulting in a significantly faster remedial timeframe capable of reaching low concentration goals (i.e., MTCA Method A cleanup levels).

11.0 REMEDIAL ALTERNATIVES EVALUATION

Under MTCA (which EPA is deferring to), when selecting from alternatives that meet the threshold requirements, the selected action must also address the following three criteria:

- **Provide a reasonable restoration time-frame (WAC 173-340-360(2)(b)(ii)).** MTCA places a preference on those alternatives that, while equivalent in other respects, can be implemented in a shorter period of time. MTCA includes a summary of factors that can be considered in evaluating whether a cleanup action provides for a reasonable restoration time-frame (WAC 173-340-360(4));
- **Use permanent solutions to the maximum extent practicable (WAC 173-340-360(2)(b)(i)).** MTCA specifies that when selecting a cleanup action, preference shall be given to actions that are "*…permanent solutions to the maximum extent practicable…*" The regulations specify the manner in which this analysis of permanence is to be conducted. Specifically, the regulations require that the costs and benefits of each of the project alternatives be balanced using a "disproportionate cost analysis" (WAC 173-340-360(3)(e); and
- **Consider Public Concerns (WAC 173-340-360(2)(b)(iii)).** EPA considers public comments submitted during the 2006 RI/FS and 2006 EIS comment periods in making its preliminary selection of a cleanup alternative for the Site.

This section describes how each of the alternatives meet the MTCA threshold screening criteria for selecting remedial options. The criteria are:

- Ability to meet MTCA Method A Cleanup Standards in Soil and Groundwater.
- Timeliness of Implementation.
- Technical Feasibility.
- Ability to Address Future Spills.
- Cost.

11.1 Alternative #1: In-Situ Chemical Oxidation (ISCO) using RegenOx® and Enhanced Biodegradation using an Oxygen Releasing Compound

Ability to meet MTCA Method A Cleanup Standards in Soil and Groundwater

- This alternative addresses gasoline contamination in groundwater and saturated soil.
- This alternative may address some gasoline contamination in the unsaturated soil above the water table if the RegenOx® and ORC-A® solution comes into direct contact with the contaminants. Due to the chemical oxidation of the contaminants and the enriched aerobic

environment over a 12-month period, the treatment should be able to treat the saturated soil and groundwater to the cleanup levels.

- Because there is contamination in the unsaturated soils beneath the building at the Site which may not come into contact with the RegenOx® and ORC-A® solution, there may be residual soil contamination which could act as a source to re-contaminated the groundwater.
- Because this alternative destroys the contaminant, it is high on Ecology's "long-term effectiveness" scale.

Timeliness of Implementation

- A permit from the Yakama Nation is required to perform any work at the Site. This typically can take up to 60 to 90 days to obtain.
- This remedial option requires four injection events two weeks apart. It is estimated that it will take 2 weeks to 3 weeks per event to inject the volume of treatment solution required to treat the Site.
- The certain portions of the Site's operations could be temporarily limited during the injection of the RegenOx® and ORC-A®.
- After the ORC® is no longer active (a minimum of 12 months) groundwater compliance monitoring for 8 consecutive quarters may be required to confirm cleanup in addition to confirmation soil sampling.
- Estimated a 4 to 6 year duration to NFA application.

Technical Feasibility

- This alternative is comparatively easy to implement, however because of the gravelly soils it may be difficult to get through the entire thickness of contaminated soil and groundwater.
- No special permits are required from the City of Toppenish that AEG is aware of. Should a city permit be needed, it will be acquired as quickly as possible. However, a permit from the Yakama Nation is needed to perform any work at the Site and EPA's Underground Injection Control program requires a notification form.
- The effectiveness of this alternative is dependent on the treatment chemicals contacting the contaminants. Since some of the contaminants in the vadose zone and beneath the former Smitty's Conoco building, they may not come into contact with the RegenOx®.
- Multiple applications (four) of the RegenOx® and ORC-A® solution will be necessary in areas of the Site to treat the contaminants at the Site.
- Preferential pathways (if they develop during application) may channel some of the product

away from areas requiring treatment.

Ability to Address Future Spills

- Since the Site is no longer being used for a gasoline fueling station the ability to address future spills is not a consideration.

Cost

- The cost for this alternative is estimated to be in the $650,000 to $750,000 range up to the time of closure.

11.2 Alternative #2: In-Situ Chemical Oxidation (ISCO) using Ozone

Ability to meet MTCA Method A Cleanup Standards in Soil and Groundwater

- This alternative addresses gasoline contamination in the saturated and unsaturated soil above the water table which can act as an ongoing source of groundwater contamination.
- This alternative is effective at reducing petroleum contamination in soil and groundwater should be able to meet MTCA Method A cleanup standards for both groundwater and soil at the Site.
- Because this alternative destroys the contaminant, it is high on Ecology's "long-term effectiveness" scale.

Timeliness of Implementation

- Before implementation a pilot test would need to be conducted in order to properly design the system. This pilot test would last approximately 6 months.
- A permit from the Yakama Nation is required to perform any work at the Site. This typically can take up to 60 days to 90 days to obtain.
- This remedial option will require the installation of ozone sparging and extraction wells possibly up to 10 wells depending on the design. The wells would then need to be connected to the treatment system through underground piping. The time frame for the system installation could be up to about 4 weeks.
- The certain portions of the Site's operations could be temporarily limited during the installation of the sparging wells.
- After the treatment by ozone (4 years), groundwater compliance monitoring for 8 consecutive quarters may be required to confirm cleanup in addition to confirmation soil sampling.
- Estimated a 4 to 6 year duration to NFA application.

Technical Feasibility

- Before implementation, a pilot test would need to be conducted in order to properly design the system.
- A permit from the Yakama Nation is needed to perform any work at the Site and EPA's Underground Injection Control program requires a notification form.
- Building and electrical permits will need to be obtained from the City of Toppenish for the electrical work.
- This alternative is comparatively easy to implement, however it is more difficult than the ISCO using RegenOx® because of the need to drill dedicated injection wells in the gravelly soil and to construct the infrastructure for the treatment system. The system would also need monthly maintenance.
- Additional electrical power may need to be brought to the Site by the PUD to run the ozone generator and the treatment system.
- There is the potential for ozone to intrude in to the buildings on the Site. Therefore vapor monitoring may be needed.
- This alternative will require the contractor to obtain construction permits from local authorities. Site utilities will need to be carefully assessed prior to the start of construction.
- Preferential pathways (if they develop during application) may channel some of the ozone away from areas requiring treatment.
- Monthly Operation and Maintenance (O&M) would be needed for the system to check on filters and ozone generation.

Ability to Address Future Spills

- Since the Site is no longer being used for a gasoline fueling station, the ability to address future spills is not a consideration.

Cost

- The cost for this alternative is estimated to be in the $900,000 to $1,200,000 range (up to the time of closure) not including the pilot testing.

11.3 Alternative #3: Air Sparging/Soil Vapor Extraction (AS/SVE)

Ability to meet MTCA Method A Cleanup Standards in Soil and Groundwater

- This alternative addresses gasoline contamination in the saturated and unsaturated soil above the water table which can act as an ongoing source of groundwater contamination;

- Over an extended period of time, this alternative should be able to meet MTCA Method A cleanup standards for groundwater and soil. It is not as aggressive as the ISCO alternative with ozone;
- Because this alternative destroys the contaminant, it is high on Ecology's "long-term effectiveness" scale.

Timeliness of Implementation

- Before implementation a pilot test would need to be conducted to properly design the system. This pilot test would last approximately 6 months.
- A permit from the Yakama Nation is required to perform any work at the Site. This typically can take up to 60 to 90 days to obtain;
- This remedial option will require the installation of air sparging and vapor extraction wells possibly up to 10 wells depending on the design. The wells would then need to be connected to the treatment system through underground piping.
- It is estimated that it will take 2 weeks to 3 weeks to install the treatment wells and to construct the associated piping system. Roughly 1 to 2 weeks will be needed for startup testing and system optimization.
- The certain portions of the Site's operations could be temporarily limited during the installation of the sparging wells.
- After the treatment (4 years), groundwater compliance monitoring for 8 consecutive quarters may be required to confirm cleanup in addition to confirmation soil sampling.
- Estimated a 4 year to 6 year duration to NFA application.

Technical Feasibility

- Before implementation, a pilot test would need to be conducted in order to properly design the system.
- This option is more complicated to implement than the In-Situ Chemical Oxidation (ISCO) using RegenOx® and Enhanced Biodegradation using an Oxygen Releasing Compound but less complicated than the ozone ISCO alternative because the potential for ozone intrusion into the buildings at the Site is not present.
- A permit from the Yakama Nation is required to perform any work at the Site.
- Building and electrical permits will need to be obtained from the City of Toppenish for the electrical work.
- Treatment of the extracted air may be needed before being discharged.

- It will be similar in technical feasibility to the ISCO alternative using ozone and the In Situ Heat-Enhanced Bioremediation alternative.
- This alternative will require the contractor to obtain construction permits from local authorities. Site utilities will need to be carefully assessed prior to the start of construction.

Ability to Address Future Spills

- Since the Site is no longer being used for a gasoline fueling station, the ability to address future spills is not a consideration.

Cost

- Although this alternative is not as aggressive as the ISCO with Ozone (Alternative #3), the costs are expected to be similar; in the $900,000 to $1,100,000 range (up to the time of closure) not including the pilot testing.

11.4 Alternative #4 – In Situ Heat-Enhanced Bioremediation

Ability to meet MTCA Method A Cleanup Standards in Soil and Groundwater

- This alternative addresses gasoline contamination in the saturated and unsaturated soil above the water table which can act as an ongoing source of groundwater contamination.
- Over an extended period of time, this alternative should be able to meet MTCA Method A cleanup standards for groundwater and soil.
- Because this alternative destroys the contaminant, it is high on Ecology's "long-term effectiveness" scale.

Timeliness of Implementation

- Before implementation a pilot test would need to be conducted in order to properly design the system. This pilot test would last approximately 6 months.
- A permit from the Yakama Nation is required to perform any work at the Site. This typically can take up to 60 to 90 days to obtain.
- This remedial option will require the installation of hot water injection wells in addition to several down gradient extraction wells. The wells would then need to be connected to the treatment system through underground piping. It is estimated that it will take 2 weeks to install the wells and to construct the associated piping system. Roughly 1 week will be needed for startup testing and system optimization.
- The certain portions of the Site's operations could be temporarily limited during the installation of the extraction and injection wells.

- It is possible that the pilot testing may meet the cleanup levels for Site in 6 to 12 months and an NFA applied for after an additional eight quarters of groundwater sampling.

Technical Feasibility

- Before implementation, a pilot test would need to be conducted to properly design the system.
- A permit from the Yakama Nation is required to perform any work at the Site.
- This option is more complicated to implement than the In-Situ Chemical Oxidation (ISCO) using RegenOx® and Enhanced Biodegradation using an Oxygen Releasing Compound but less complicated than the ozone ISCO and AS/SVE alternatives because there may not need to be as many treatment system wells on the Site. The wells used for the pilot test may be sufficient to treat the Site to the point of no further action.
- This alternative will require the contractor to obtain construction permits from local authorities. Site utilities will need to be carefully assessed prior to the start of construction.
- Additional electrical power may need to be brought to the Site by the PUD to run the treatment system.
- Natural gas will need to be connected to the treatment system boiler.
- There would not be the need to discharge extracted water to the City for disposal.

Ability to Address Future Spills

- Since the Site is no longer being used for a gasoline fueling station the ability to address future spills is not a consideration.

Cost

- Because the pilot test may be sufficient to treat the Site, the costs presented are for the six-month pilot testing, and quarterly groundwater monitoring for two years after the pilot testing. The costs also include costs to closure assuming the six-month pilot testing achieves cleanup. The costs are estimated to be in the range of $600,000 to $700,000, and are significantly less than the other alternatives. Should cleanup not be achieved during the six-month pilot testing, the costs will increase.

12.0 COST ESTIMATES AND DISPROPORTIONATE COST ANALYSIS

The MTCA analysis of disproportionate costs is used to evaluate which cleanup alternatives, among those that otherwise meet threshold requirements, are permanent to the maximum extent practicable (WAC 173-340-360(2)(b);173-340-360(3)). This analysis compares the relative benefits and costs of cleanup alternatives. Seven criteria are used in the disproportionate cost analysis as specified in WAC 173-340-360(3)(f); which are:

- Protectiveness.
- Permanence.
- Long-Term Effectiveness.
- Short-Term Risk Management.
- Technical and Administrative Implementability.
- Considerations of Public Concerns.
- Costs.

The analysis compares the relative benefits of each alternative against those provided by the most permanent alternative. A majority of these benefits are environmentally based, while others are related but non-environmental, such as "Implementability". The comparison of costs and benefits may be quantitative, but is more often qualitative, or subjective.

> *"Costs are disproportionate to benefits if the incremental costs of the more permanent alternative exceed the incremental degree of benefits achieved by the other lower cost alternative (WAC 173-340-360(e)(i))".*
>
> *"Where two or more alternatives are equal in benefits, the Department shall select the less costly alternative (WAC 173-340-360(e)(ii)(c))".*
>
> "*…Quantitative data should be available regarding the estimated volume of contamination that will be treated, removed, or contained. This data will be used by VCP Site managers to help perform a qualitative analysis of the protectiveness, permanency, and long-term effectiveness of each alternative in the study. Quantitative data is generally not available for a comparison of all the benefits of each cleanup alternative. Benefits criteria fall into both environmental and other related non-environmental categories. As described above, these categories are essentially subjective. For this reason, the agency's analysis of which alternative is permanent to the maximum extent practicable is largely qualitative…"*

> *"The MTCA regulation allows the agency to use best professional judgment to assess benefits qualitatively, and to use its discretion to favor or disfavor qualitative benefits (WAC 173-340-360(3)(e)(ii)(C))".*

Based upon AEG's experience, best professional judgment, and the application of scientific principles, each of the non-cost evaluation criteria is assigned a ranking score from 1 to 5, with 5 representing the highest overall perceived benefit, and a score of 1 representing the lowest overall perceived benefit. In an effort to better document its qualitative analysis for this Site, weighting factors are assigned for each of the six non-cost benefits criteria. The weighting factors are subjective and serve to represent AEG's opinion on the importance of each benefits criterion at a site, relative to its mandate to protect human health and the environment.

General descriptions of each of the seven MTCA-criterion used in the disproportionate cost analysis are described below consistent with WAC 173-340-360(1).

12.1 Protectiveness

Overall protectiveness is a parameter that considers many factors. First, it considers the extent to which:

> *"…human health and the environment are protected and the degree to which overall risks at a site are reduced (WAC 173-340-360(3)(f)(i))".*

It also considers the time required to reduce risk at the facility and attain cleanup standards. Both on-Site and off-Site risks resulting from implementing the Alternative are considered. Finally, it measures the improvement of the overall environmental quality at the Site. A weighting factor of 30 percent (%) was assigned to protectiveness. This represents the greatest value of all categories and is justified, based on its overarching importance relative to the ultimate goal of environmental cleanup and protection of human health and the environment.

12.2 Permanence

The permanence of remedies under MTCA is measured by the relative reduction in toxicity, mobility or volume of hazardous substances, including both the original contaminated media, and to a lesser degree the residuals generated by the cleanup action as this is included in short term risk management. MTCA defines "*Permanence*" as:

> *"…The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and improvement of the overall environmental quality…" (WAC 173-340-360(3)(f)(ii)).*

A weighting factor of 20% was assigned to "*Permanence*". This weighting factor is associated with the need or lack thereof for further action in the future. This factor, along with "*Long-term Effectiveness*", is of second-greatest importance. A high level of certainty must come with the final environmental cleanup, so that future actions will not be necessary. This criterion is intimately associated with overall protectiveness, but incorporates a greater factor of time.

12.3 Effectiveness Over the Long Term

Effectiveness over the long term is defined in WAC 173-340-360(3)(f)(iv) as:

> *"…Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels, the magnitude of residual risk with the alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components may be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness: Reuse or recycling; destruction or detoxification; immobilization or solidification; on-site or off-site disposal in an engineered, lined and monitored facility; on-site isolation or containment with attendant engineering controls; and institutional controls and monitoring..".*

A weighting factor of 20% was assigned to "*Effectiveness Over the Long Term*". This weighting factor is associated with the need or lack thereof for further action in the future. This factor, along with "*Permanence*", is of second-greatest importance. A high level of certainty must come with the final environmental cleanup, so that future actions will not be necessary.

12.4 Management of Short-Term Risks

Management of short-term risks is defined in WAC 173-340-360(3)(f)(v) as:

> *"…The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks..."*

Every remedial option has a short-term risk associated with the implementation. This risk included potential exposure to vapors, fugitive dust and/or contact with the contaminated media. These risks are usually manageable and therefore are not considered as important as the previous criteria. Therefore it has been given a weighting factor of 10%.

12.5 Technical and Administrative Implementability

Technical and administrative implementability is defined in WAC 173-340-360(3)(f)(vi) as:

> *"…Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary off-site facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility operations and other current or potential remedial actions…"*

This criterion includes the concepts of technical possibility, access, necessary resources, monitoring requirements and integration into existing facility features. The primary determining sub-criterion is alternative technical possible. This criterion has been given a weighting factor of 10%.

12.6 Consideration of Public Concerns

Consideration of public concerns is defined in WAC 173-340-360(3)(f)(vii) as:

> *"…Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns. This process includes concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the site…"*

At this point, public concerns have not been raised at this Site, but are assumed to be – access to the businesses that occupy the Site, and the source of power and water to be used for the Remedial alternative. In addition, the Yakama Nation has indicated a reluctance for any kind of injection work at the Site. This issue will need to be addressed before work progresses. However, it is anticipated that the issue will be resolved, with the help of EPA if needed. This criterion has been given a weighting factor of 10%.

12.7 Remedy Costs

The analysis of costs under MTCA includes all costs associated with implementing the Alternative, including design, construction, long-term monitoring, and institutional controls (WAC 173-340-360(3)(f)(iii)). Costs are intended to be comparable among different project Alternatives to assist in the overall analysis of relative costs and benefits of different Alternatives.

Costs are evaluated against remedy benefits in order to assess cost-effectiveness and remedy practicability. No weighting factor is applied to this quantitative category.

Order-of-magnitude remediation costs (i.e., -30% to +50%) have been estimated for each of the remedial alternatives based on the descriptions and associated assumptions presented in Sections 10 and 11, and without engineering design or contractor bidding. The order-of-magnitude

remedial costs are based on best professional judgment, typical costs for Washington State, and the current knowledge of the Site. All costs are assumed to be for newly purchased equipment and not refurbished or used.

The following table summarizes these estimated costs. These costs are for comparison purposes only and actual implementation costs will vary from those provided below. These estimated costs incorporate a variety of necessary assumptions and the validity of those assumptions cannot be fully known at this time.

Remedial Alternative	Order of Magnitude Remediation Costs Estimate
1) In-Situ Chemical Oxidation and Enhanced Bioremediation (ISCO) using RegenOx® ORC-A®	$650,000 to $750,000
2) In-Situ Chemical Oxidation using Ozone	$900,000 to $1,200,000
3) Air Sparging/Soil Vapor Extraction	$900,000 to $1,100,000
4) In-Situ Heat-Enhanced Bioremediation	$600,000 to $700,000

12.8 Disproportionate Cost Analysis

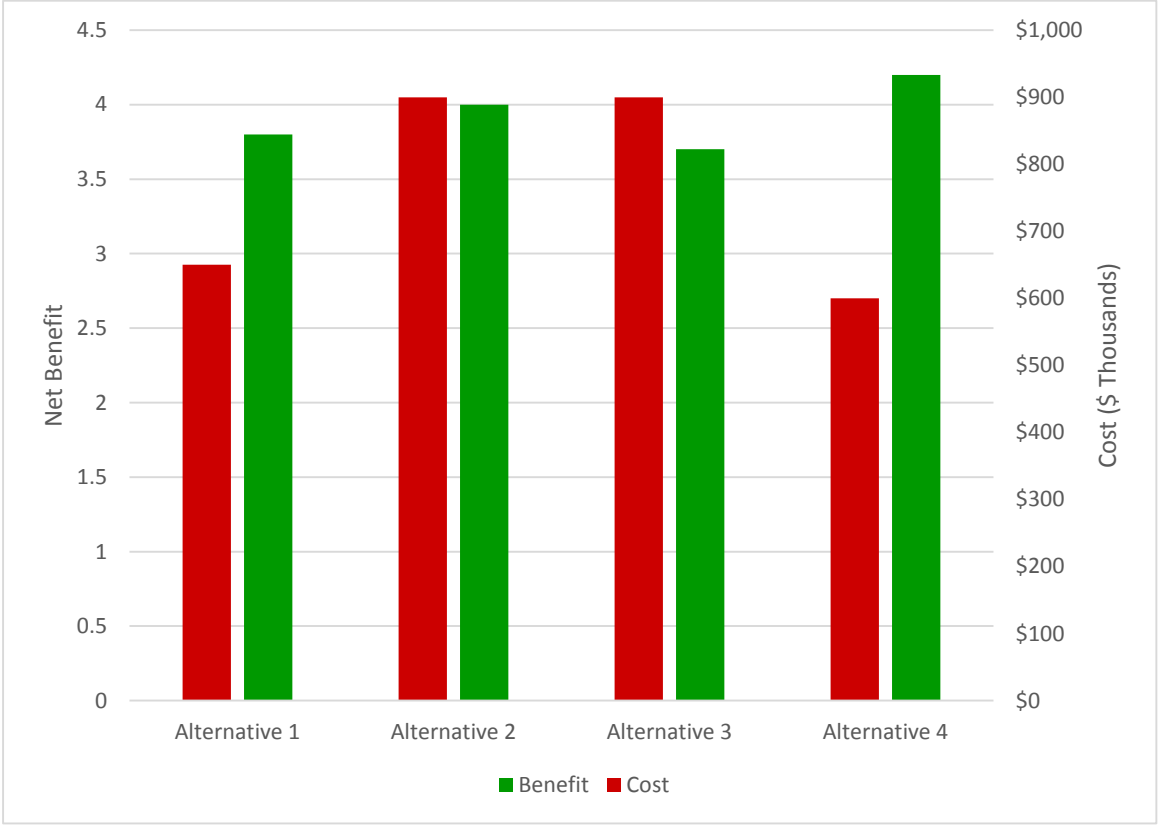
As previously discussed, each alternative was assigned a ranking score for each of the non-cost evaluation criteria. The score was then weighted using the previously described weighting factors and an overall benefit ranking developed. The following table presents the rankings and score summaries.

Remedial Alternative Scoring

Criteria (Weighting Factor)	**Alternative 1** (ISCO - RegenOx®)		**Alternative 2** (ISCO – Ozone)		**Alternative 3** (AS/SVE)		**Alternative 4** (In-Situ Heat-Enhanced Bioremediation)	
	Rank	**Value**	**Rank**	**Value**	**Rank**	**Value**	**Rank**	**Value**
Protectiveness (0.3)	3	0.9	4	1.2	3	0.9	4	1.2
Permanence (0.2)	5	1	5	1	5	1	5	1
Long-term Effectiveness (0.2)	4	0.8	4	0.8	4	0.8	4	0.8
Short-term Risk (0.2)	4	0.4	3	0.3	3	0.3	4	0.4
Implementability (0.1)	3	0.3	3	0.3	3	0.3	4	0.4
Public Concerns (0.1)	4	0.4	4	0.4	4	0.4	4	0.4
Overall Benefit Value	**3.8**		**4**		**3.7**		**4.2**	

The chart below compares the net benefit ranking to the estimated costs.

Cost to Benefit Analysis



13.0 RECOMMENDED REMEDIAL ALTERNATIVE

Based on this Feasibility Study, Alternative 4 - *In-Situ Heat-Enhanced Bioremediation*, best meets the criteria for selection of a remedy as outlined by MTCA and adopted by EPA for this Site. This approach complies with applicable regulations, is protective of human health and the environment, is reasonably practicable, and can be readily implemented at the Site.

The "*Disproportionate Cost Analysis*" shows that Alternative 4 also provides the best cost-to-benefit ratio of the available alternatives.

Based on this Feasibility Study and the disproportionate cost estimate, AEG recommends that Alternative 4 be implemented at the Site and that the pilot test be conducted. The actual cost of implementation of this technology as well as the other technologies considered is highly dependent upon the intrinsic soil properties at the Site such as the extraction and injection wells, hydraulic permeability, and contaminant mass recovery rates. The cost of implementing this technology will depend upon these design factors. Field scale pilot testing would resolve these uncertainties and would allow for a more detailed understanding of the costs and logistics of implementing the technologies.

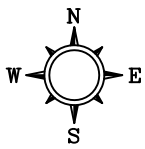
14.0 LIMITATIONS

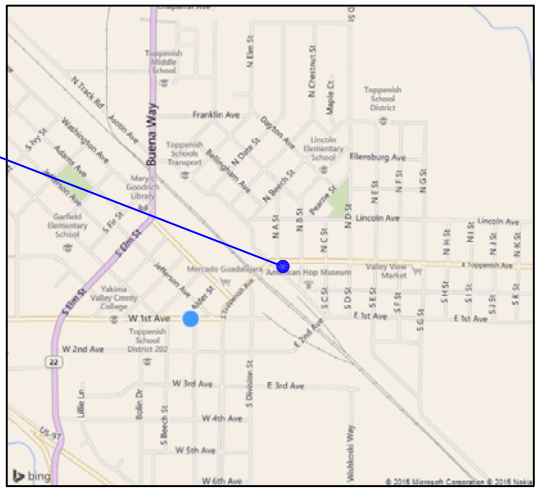
Recommendations, opinions, Site history, and proposed actions contained in this report apply to conditions and information available at the time this report was completed. To the extent that preparation of this Feasibility Study report has required the application of best professional judgment and the application of scientific principles, certain results of this work have been based on subjective interpretation. Since conditions and regulations beyond our control can change at any time after completion of this report, or our proposed work, we are not responsible for any impacts of any changes in conditions, standards, practices, and/or regulations subsequent to our performance of services. We make no warranties express or implied, including and without limitation, warranties as to merchantability, or fitness for a particular purpose. The information provided in this FINAL Feasibility Study Report is not to be construed as legal advice.

This FINAL Feasibility Study Report has been prepared on behalf of R.H. Smith Distributing Company, Inc., in partial fulfillment of an Administrative Order on Consent (Docket No. RCRA-10-2010-0136), as modified.

FIGURES AND TABLES

605 11th Ave. SE, Suite 201 • Olympia, WA • 98501
Phone: 360-352-9835 • Fax: 360-352-8164 • Email: admin@aegwa.com





NOTES

1. THE LOCATIONS OF ALL FEATURES SHOWN ARE APPROXIMATE
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VICINITY MAP

NOT TO SCALE

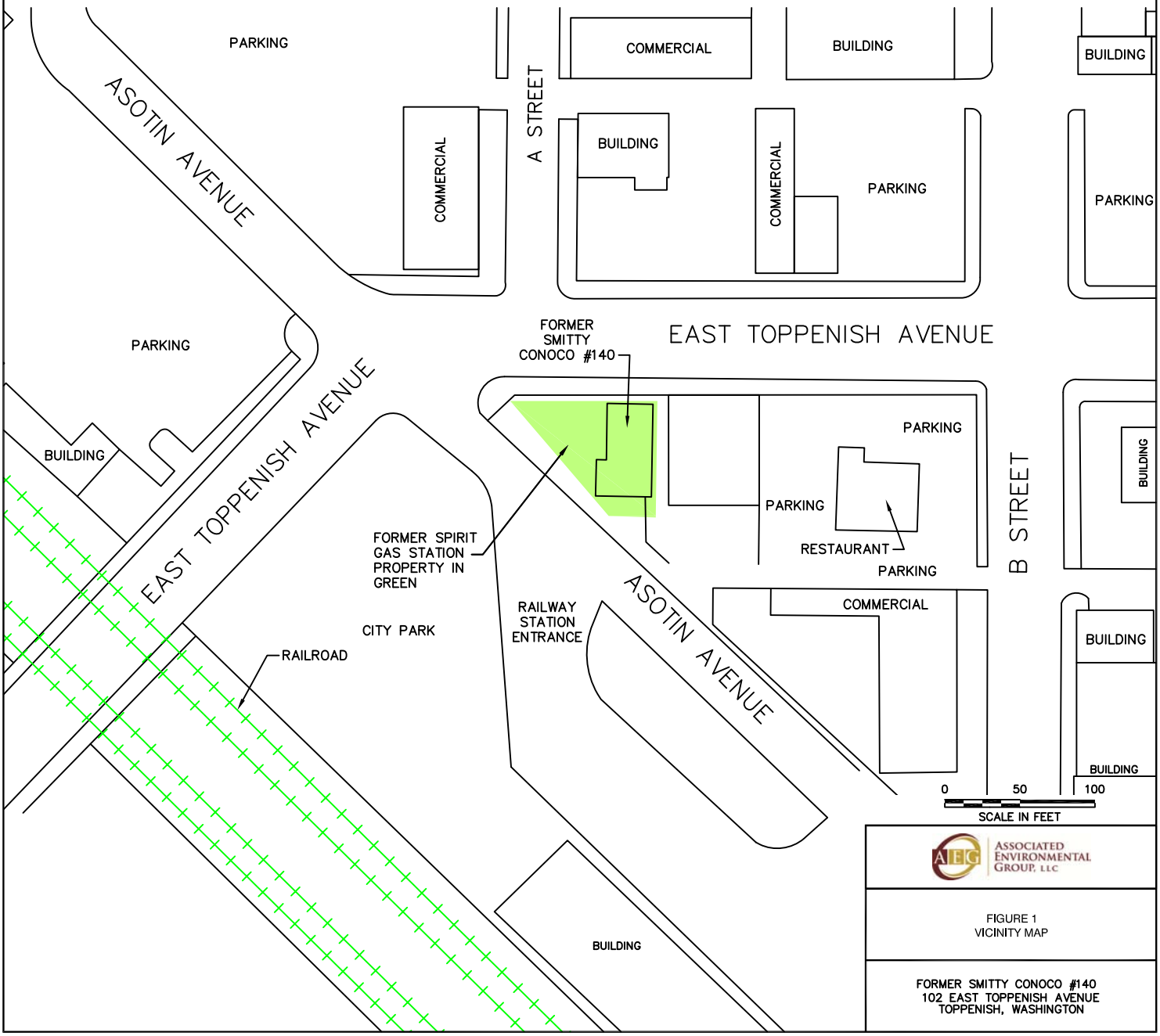

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FIGURE 1
VICINITY MAP

FORMER SMITTY CONOCO #140
102 EAST TOPPENISH AVENUE
TOPPENISH, WASHINGTON

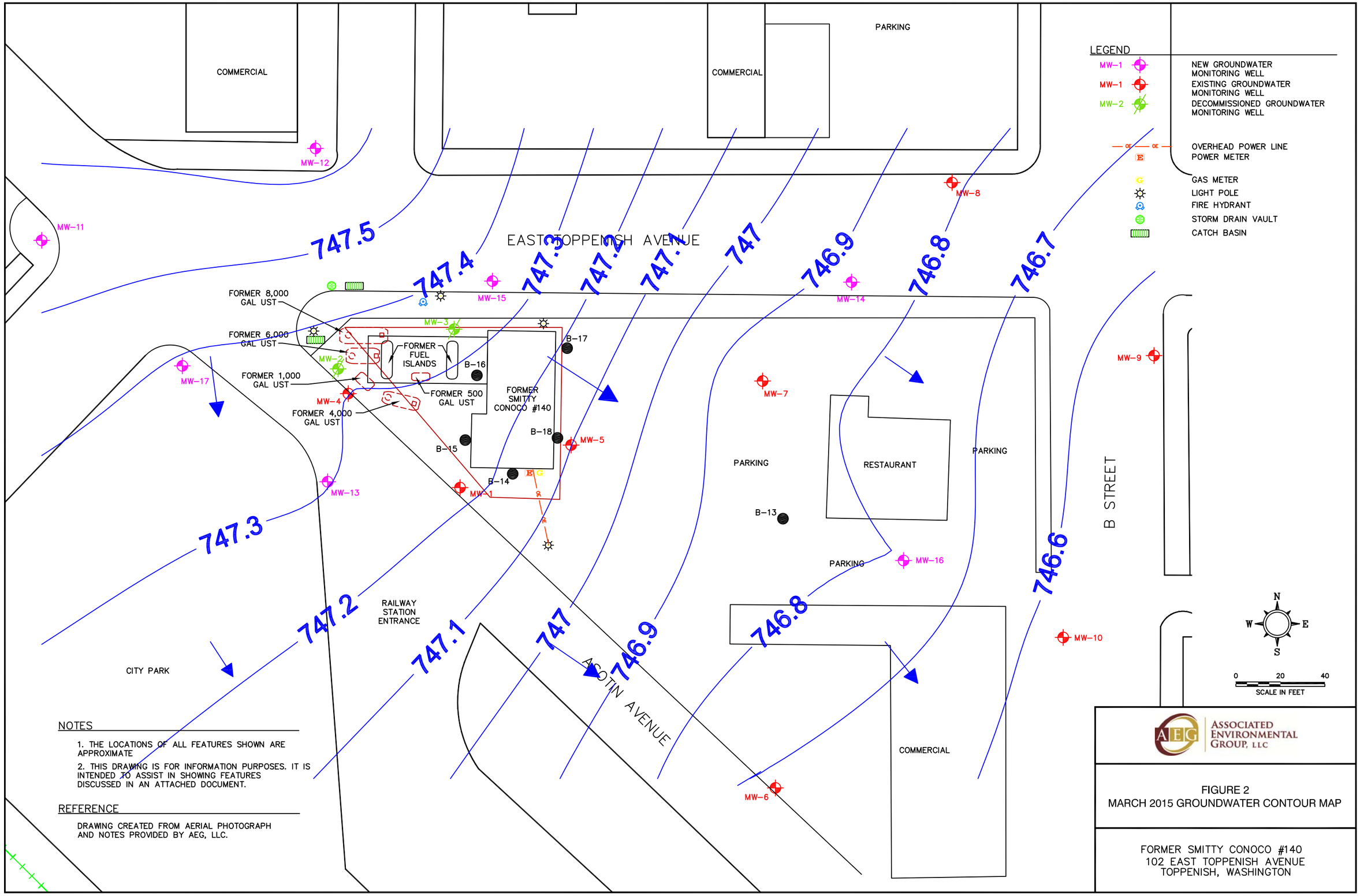

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FIGURE 2
MARCH 2015 GROUNDWATER CONTOUR MAP

FORMER SMITTY CONOCO #140
102 EAST TOPPENISH AVENUE
TOPPENISH, WASHINGTON

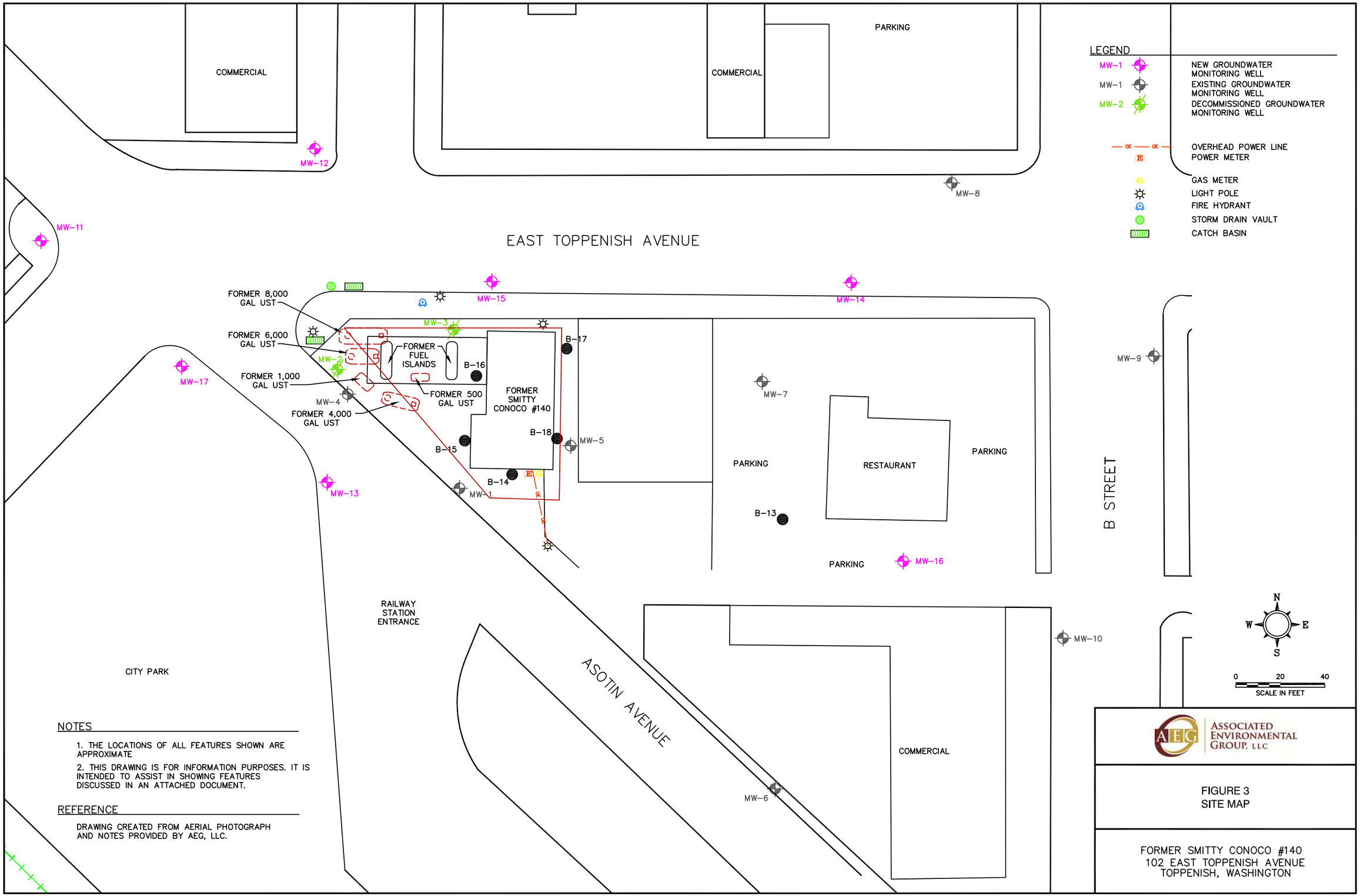

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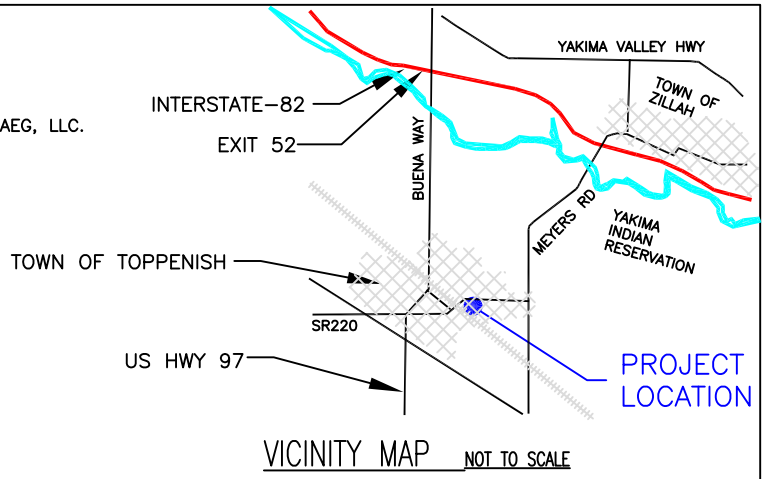
FIGURE 3
SITE MAP

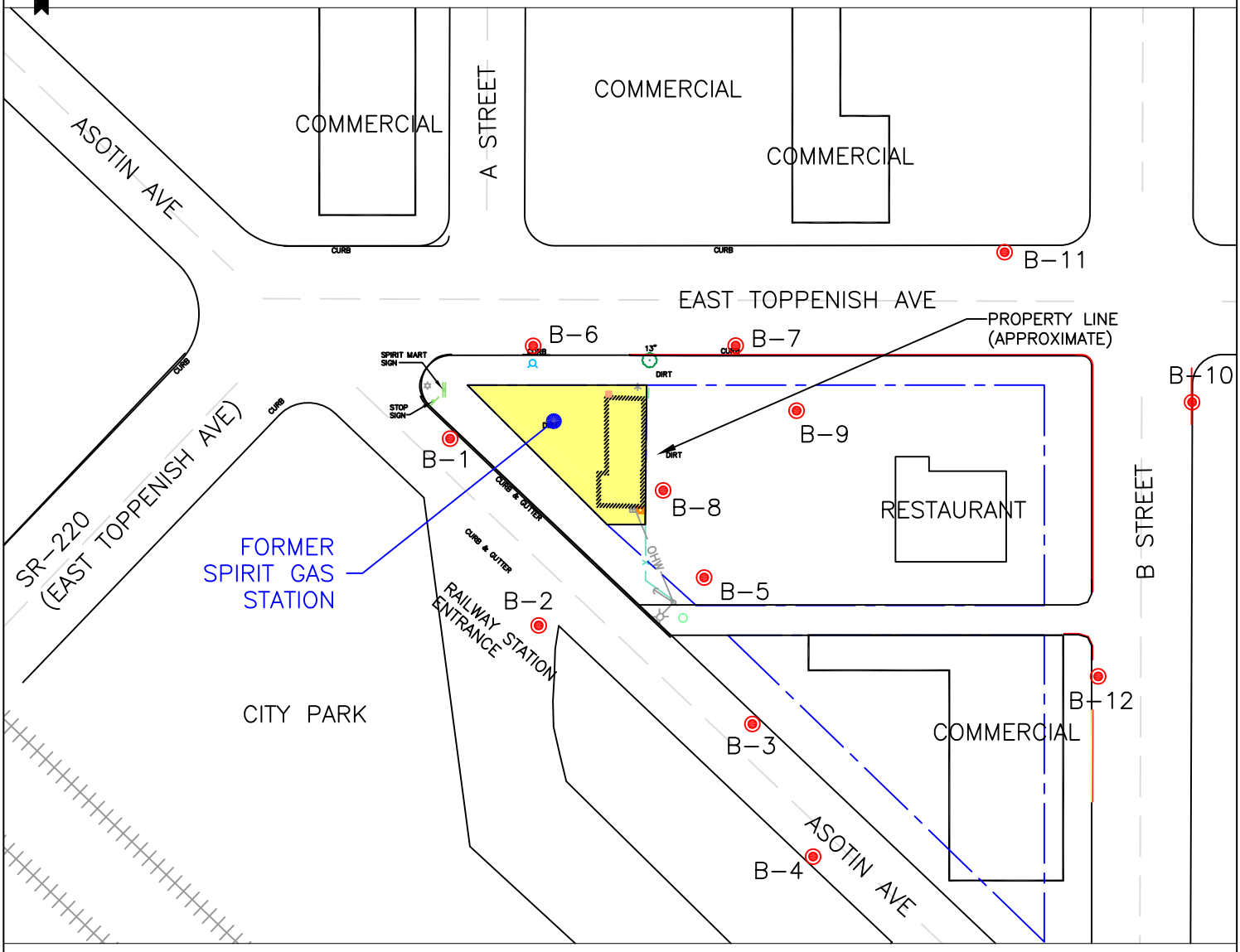
FORMER SMITTY CONOCO #140
102 EAST TOPPENISH AVENUE
TOPPENISH, WASHINGTON

Notes:
(1) The locations of all features shown are approximate.
(2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from satellite photograph and notes provided by AEG, LLC.



VICINITY MAP NOT TO SCALE



LEGEND

PUSH PROBE BORING LOCATION

SCALE: 1"=80 FEET

0 40 80 160

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605 11th Avenue Suite 201
Olympia, WA 98501
(360) 352-9835 Fax (360) 352-8164

FIGURE 4 – OFF PROPERTY

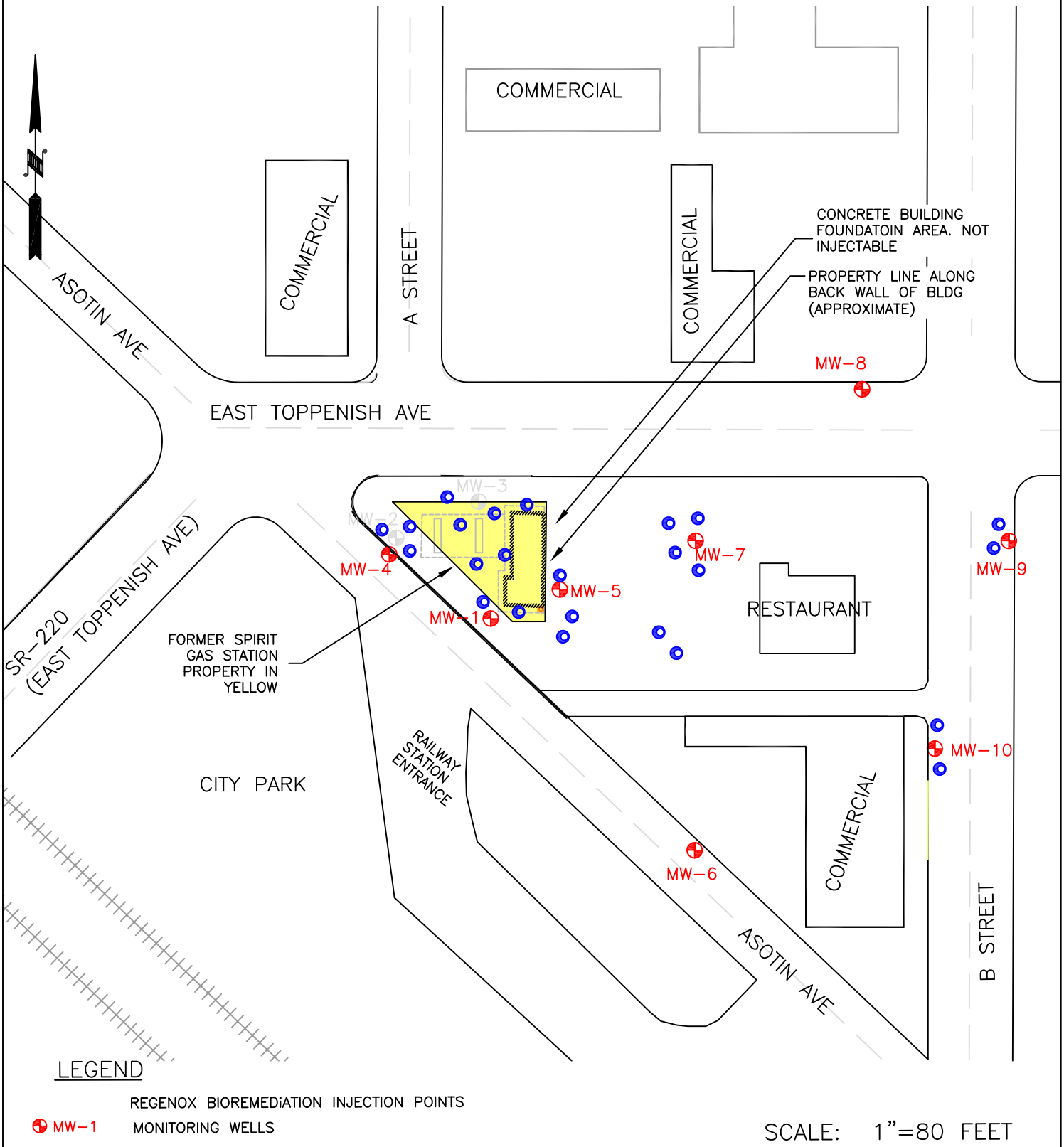
PUSH PROBE BORING LOCATIONS

SMITTY CONOCO #140
102 E TOPPENISH AVE
TOPPENIISH, WA

Project# 09-171	Date: 2/18/2011
File: SMITTY'S T	Sheet

Notes:
(1) The locations of all features shown are approximate.
(2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

Reference: Drawing created from satellite photograph and notes provided by AEG, LLC.



LEGEND

REGENOX BIOREMEDiATION INJECTION POINTS

MW-1 MONITORING WELLS

SCALE: 1"=80 FEET

AEG Associated Environmental Group, LLC	FIGURE 5 REGENOX INJECTION POINTS	SMITTY CONOCO #140 102 E. TOPPENISH AVE TOPPENISH, WA
		Project# 09-171 / Date: 12/17/2013 File: FILE NAME / Sheet

Notes:
(1) The locations of all features shown are approximate.
(2) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.

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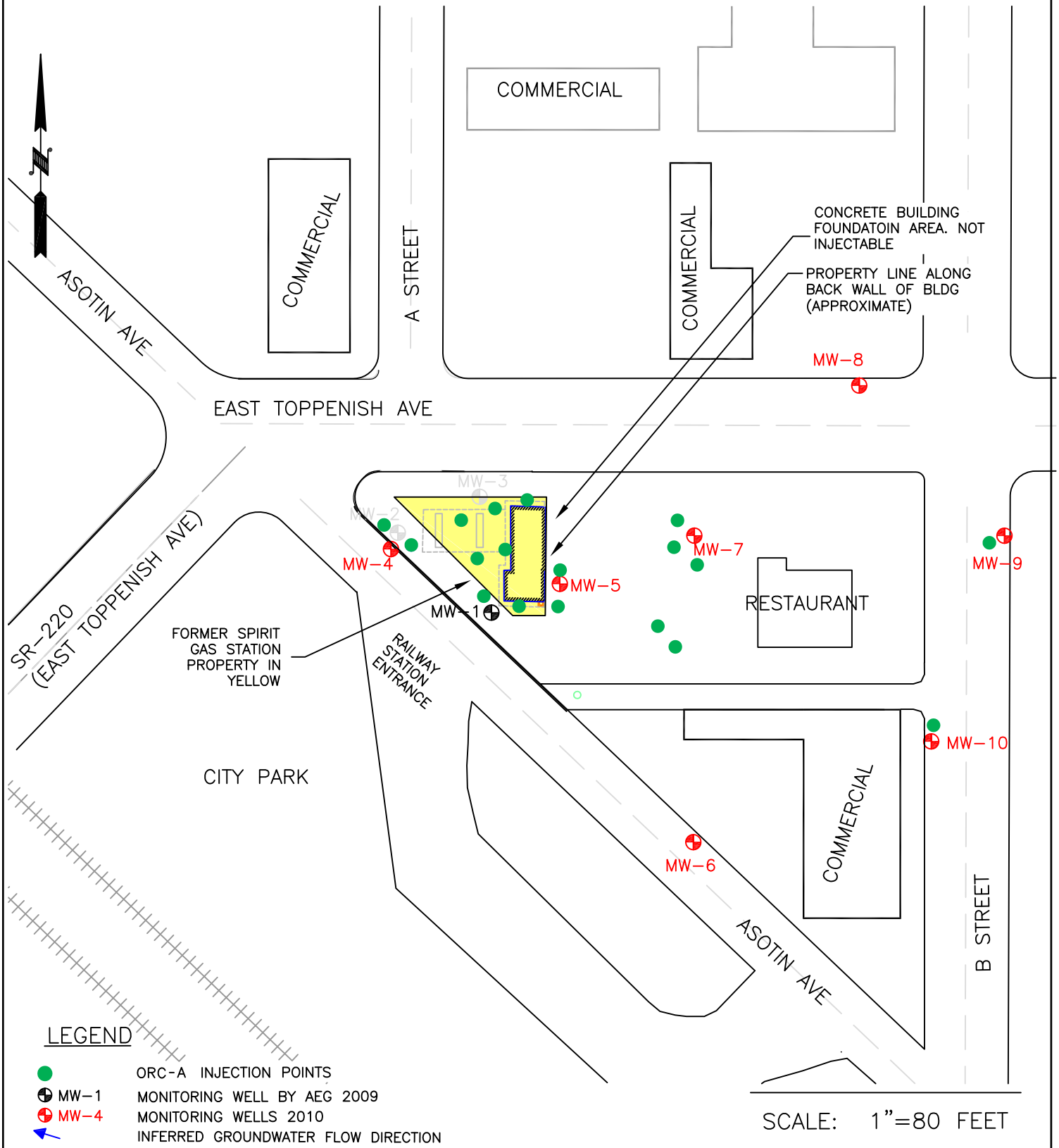

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FIGURE 6
ORC - A
INJECTION POINTS

SMITTY CONOCO #140
102 E. TOPPENISH AVE
TOPPENISH, WA

Project#	Date: 03/12/2012
File: FILE NAME	Sheet 1 OF 1

11-190

NP

NP

ICD

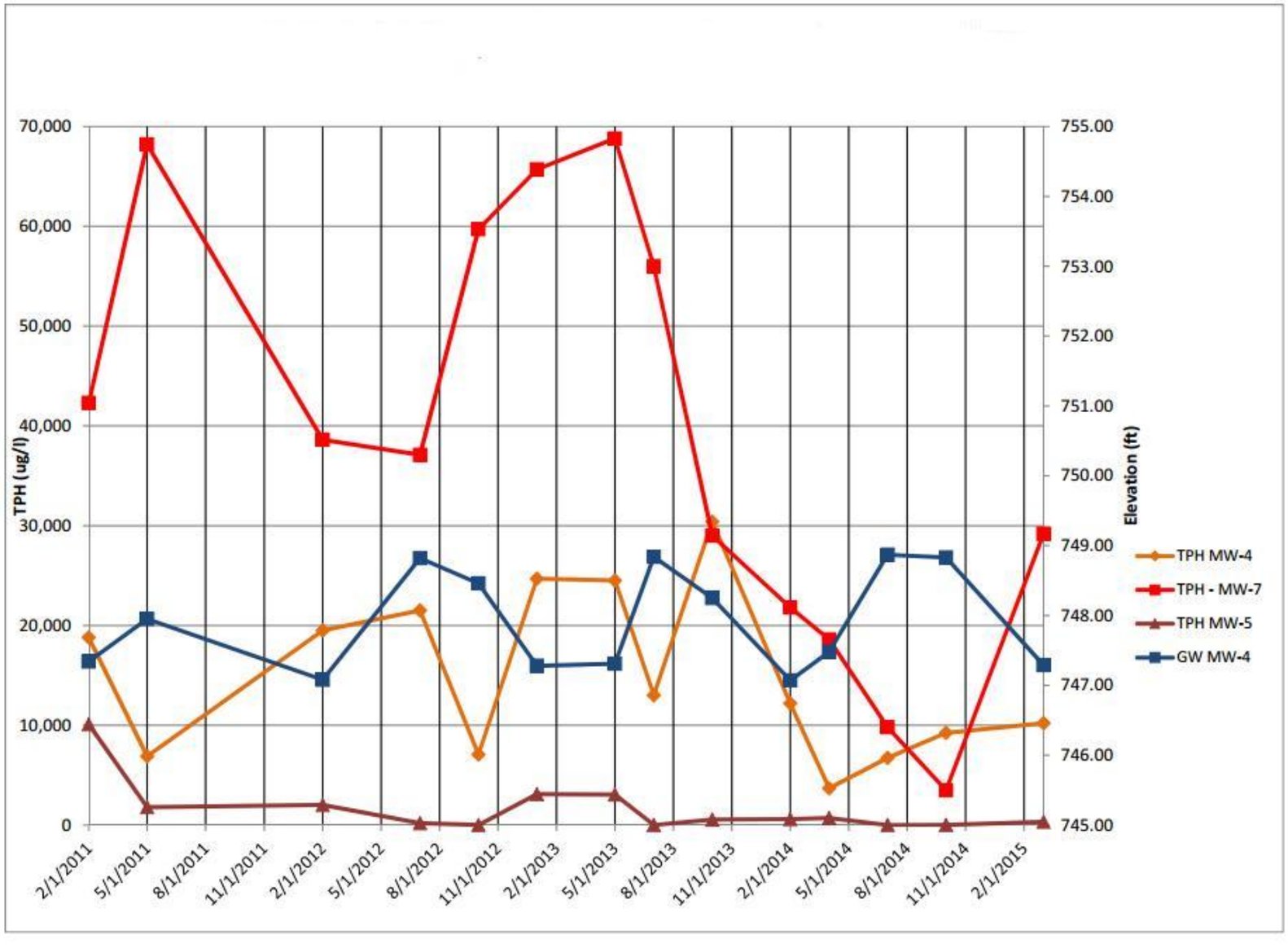

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FIGURE 7
GASOLINE-RANGE
TPH AND GROUNDWATER vs TIME

FORMER SMITTY CONOCO #140

102 EAST TOPPENISH AVENUE
TOPPENISH, WASHINGTON

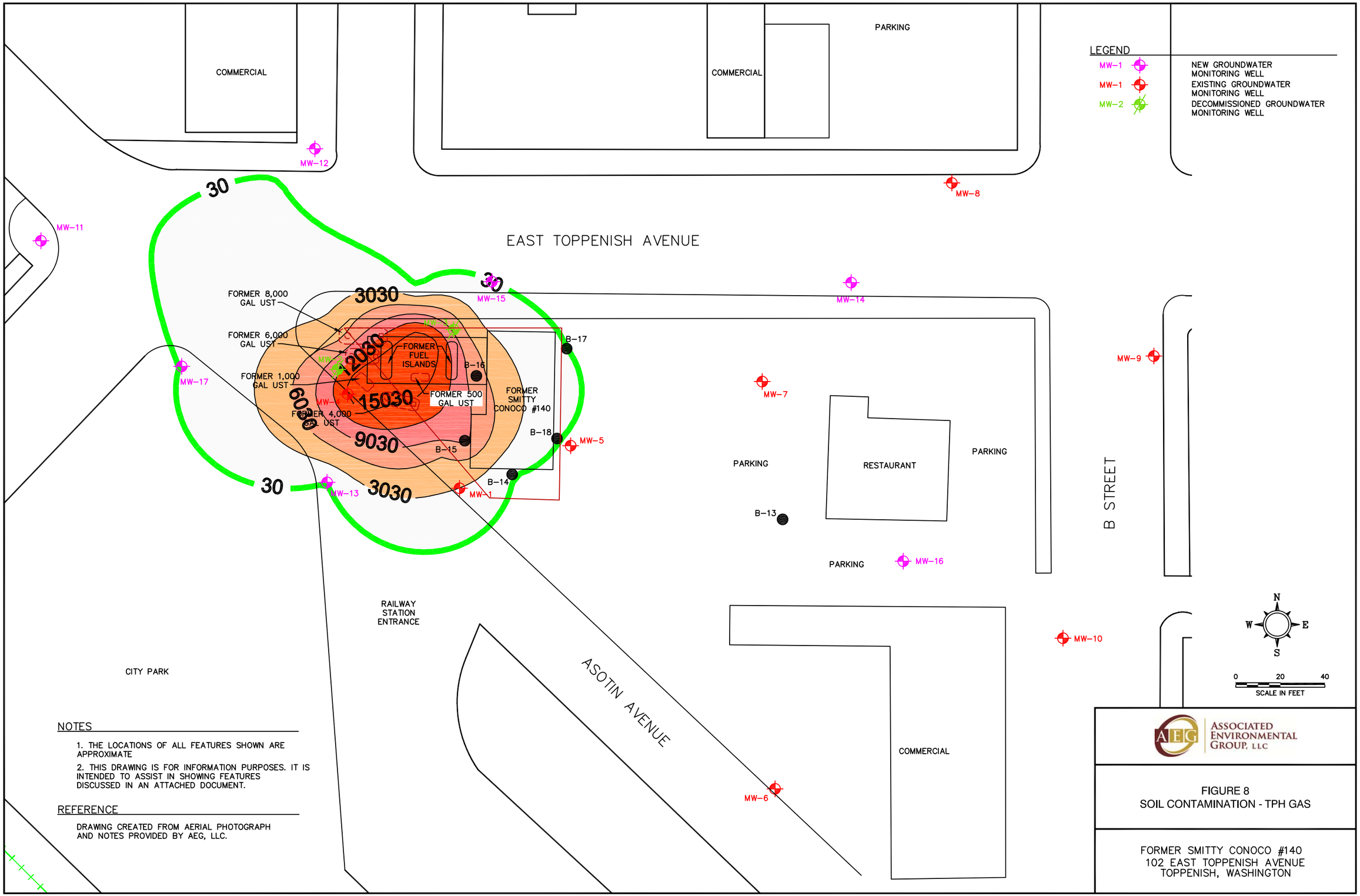

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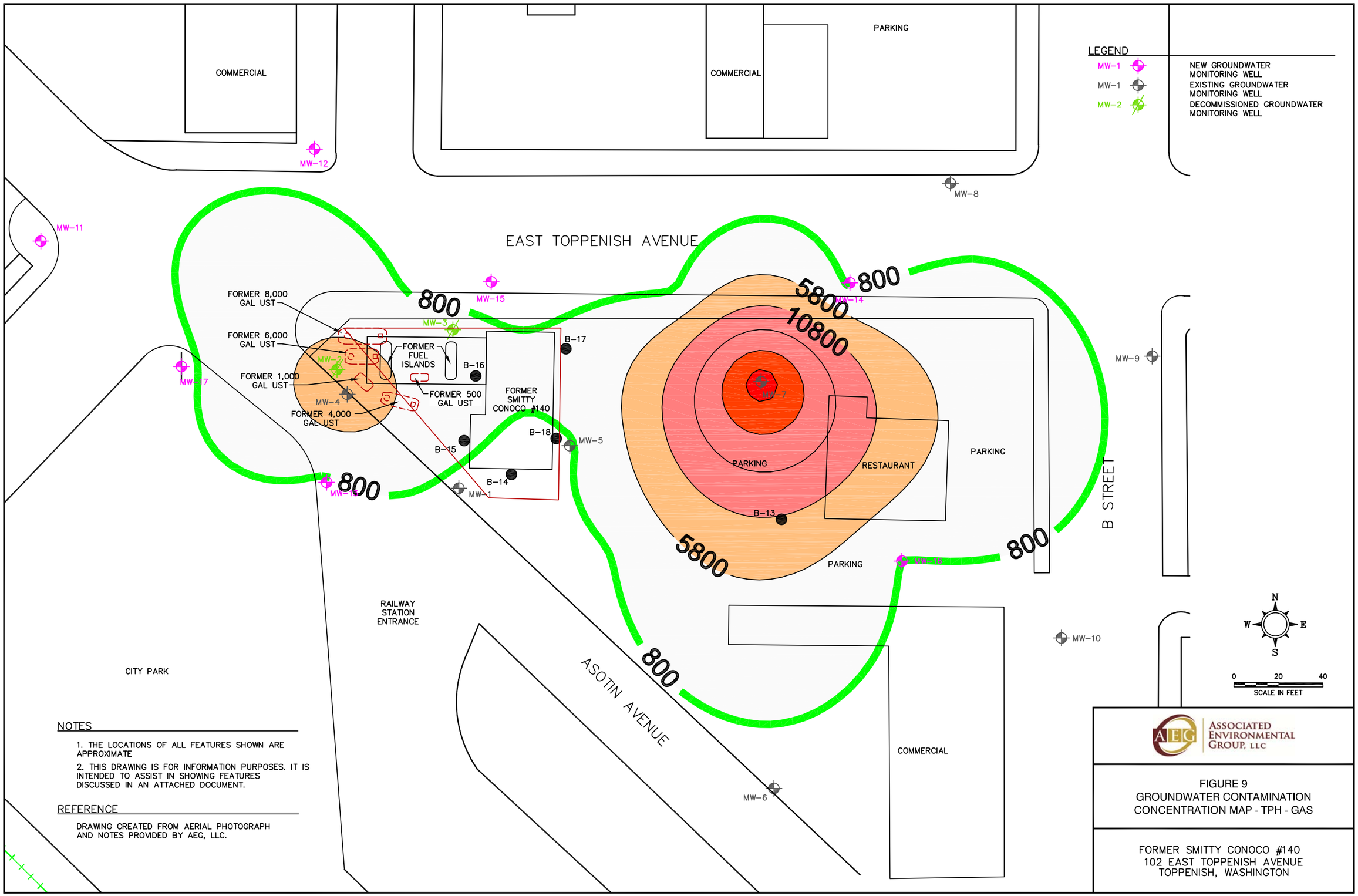
FIGURE 8
SOIL CONTAMINATION - TPH GAS

FORMER SMITTY CONOCO #140
102 EAST TOPPENISH AVENUE
TOPPENISH, WASHINGTON


COMMERCIAL
COMMERCIAL
PARKING
MW-12
MW-8
MW-11
EAST TOPPENISH AVENUE
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MW-15
MW-14
5800
10800
800
FORMER 8,000 GAL UST
FORMER 6,000 GAL UST
FORMER 1,000 GAL UST
FORMER 4,000 GAL UST
MW-3
MW-2
MW-4
FORMER FUEL ISLANDS
FORMER 500 GAL UST
FORMER SMITTY CONOCO #140
B-17
B-16
B-18
B-15
B-14
MW-1
MW-5
MW-7
MW-17
MW-9
PARKING
RESTAURANT
PARKING
B-13
B STREET
800
5800
PARKING
MW-13
800
RAILWAY STATION ENTRANCE
CITY PARK
ASOTIN AVENUE
800
MW-10
MW-6
COMMERCIAL
LEGEND
MW-1
NEW GROUNDWATER MONITORING WELL
MW-1
EXISTING GROUNDWATER MONITORING WELL
MW-2
DECOMMISSIONED GROUNDWATER MONITORING WELL
N
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0
20
40
SCALE IN FEET
NOTES
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REFERENCE
DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.
ASSOCIATED ENVIRONMENTAL GROUP, LLC
FIGURE 9
GROUNDWATER CONTAMINATION CONCENTRATION MAP - TPH - GAS
FORMER SMITTY CONOCO #140
102 EAST TOPPENISH AVENUE
TOPPENISH, WASHINGTON

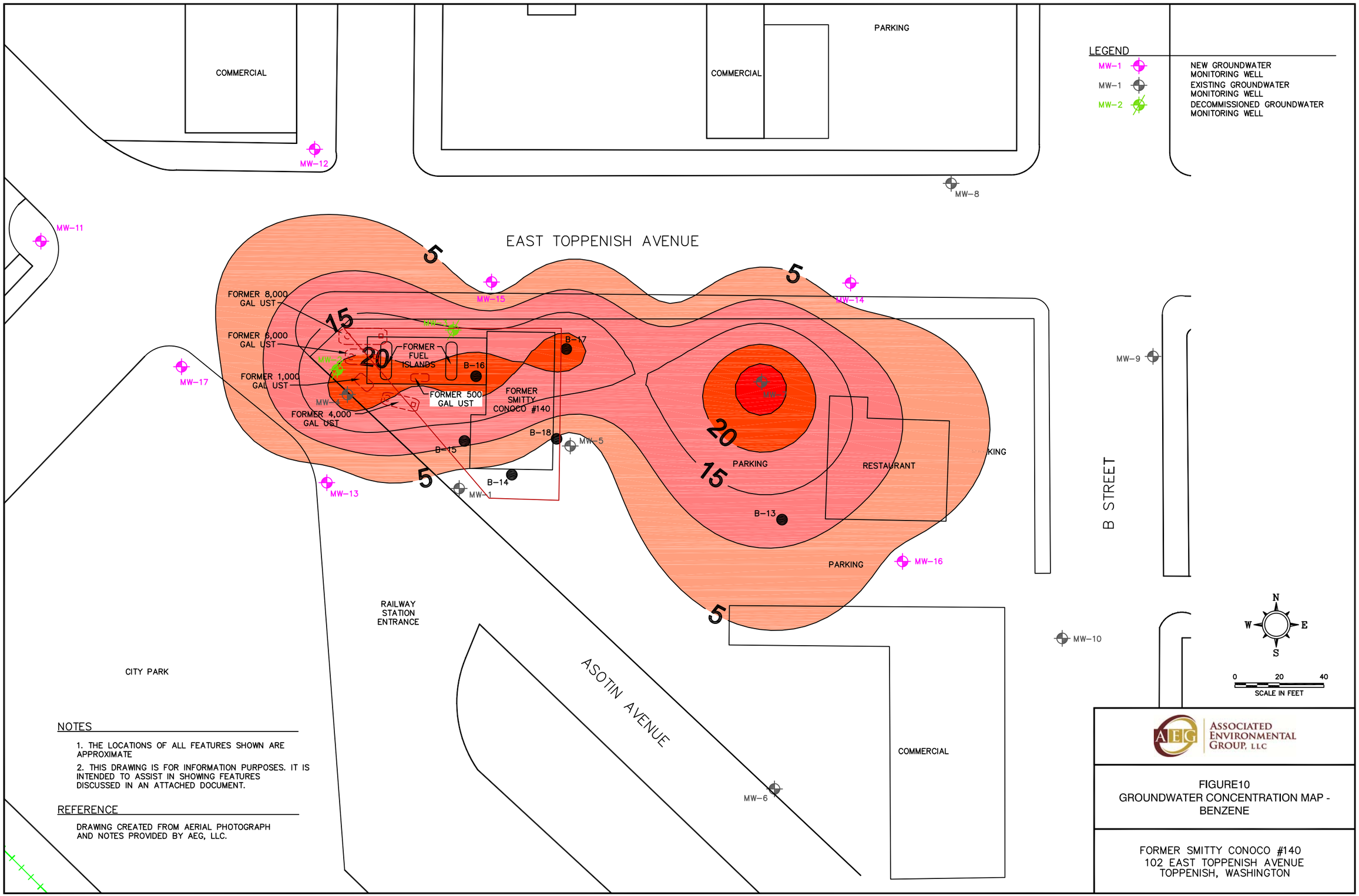

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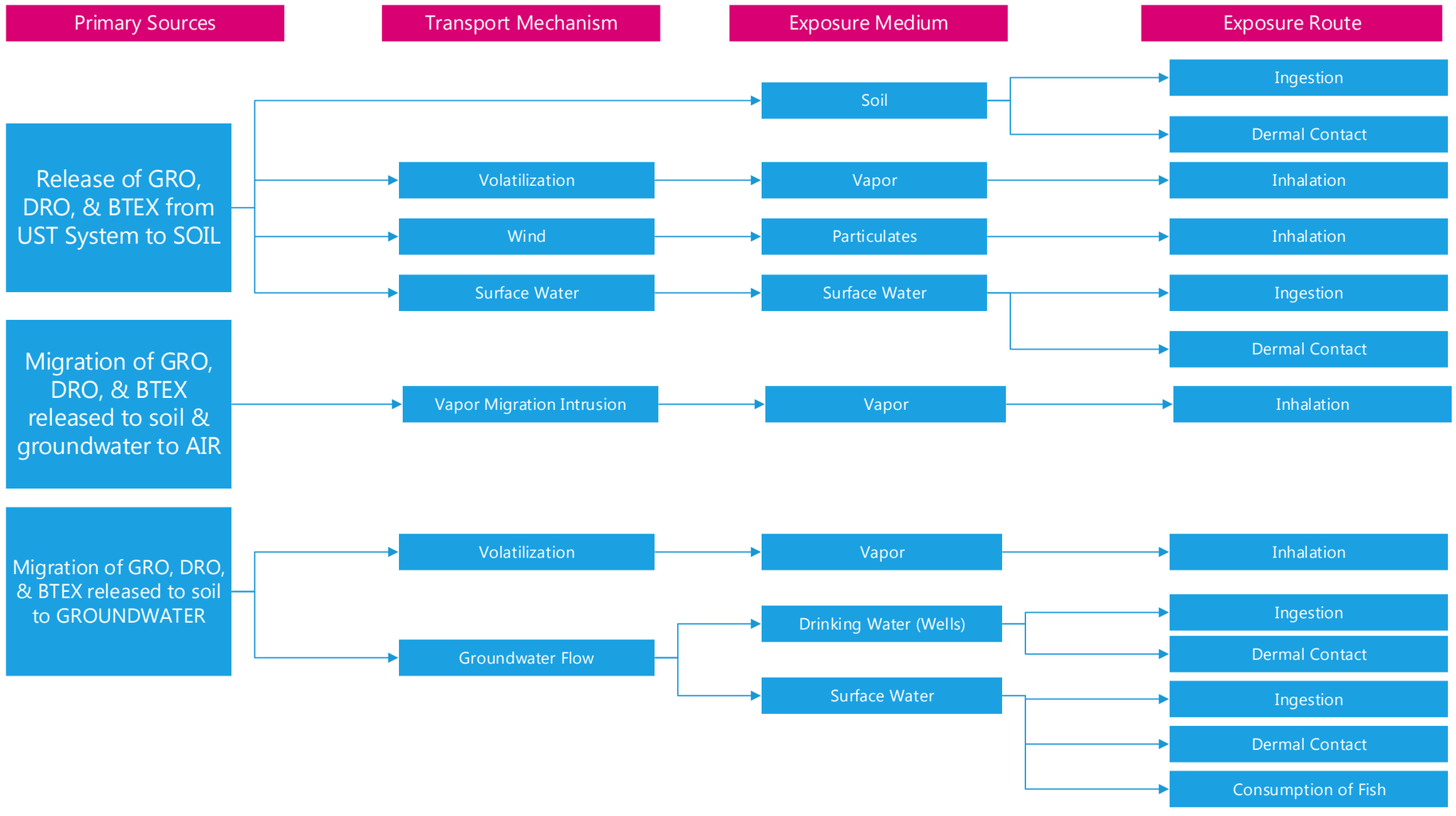
FIGURE10
GROUNDWATER CONCENTRATION MAP - BENZENE

FORMER SMITTY CONOCO #140
102 EAST TOPPENISH AVENUE
TOPPENISH, WASHINGTON



Pathway Potentially Complete?					
Residents	Employees	Customers/ Trespassers	Utility Workers	Terrestrial Organisms	Aquatic Organisms
-	-	-	Yes	-	-
-	-	-	Yes	-	-
-	Yes	Yes	Yes	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	Yes	Yes	Yes	-	-
-	Yes	Yes	Yes	-	-
Yes	Yes	Yes	-	-	-
Yes	Yes	Yes	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

ASSOCIATED ENVIRONMENTAL GROUP, LLC

Figure 11
Conceptual Site Model

Former Smitty's Conoco #140
102 East Toppenish Avenue
Toppenish, Washington

Table 1 - Summary of Groundwater Elevations
Former Smitty Conoco #140 (Former Spirit Gas Station)
Toppenish, Washington

Well Number/ TOC Elevation (feet)	Date of Measurement	Depth to Water (feet)	Depth to Liquid Phase Hydrocarbons (feet)	Thickness Liquid Phase Hydrocarbons (feet)	Groundwater Elevation (feet)	Change in Groundwater Elevation (feet)
MW-1	07/19/05	--	--	--	--	--
759.05	08/22/06	--	--	--	--	--
	10/09/07	--	--	--	--	--
	09/08/09	--	--	--	--	--
	10/13/09	--	--	--	--	--
	02/01/11	11.80	--	--	747.25	--
	05/18/11	11.18	--	--	747.87	0.62
	02/28/12	12.06	--	--	746.99	-0.88
	07/18/12	10.31	--	--	748.74	1.75
	10/23/12	10.70	--	--	748.35	-0.39
	01/29/13	11.88	--	--	747.17	-1.18
	05/01/13	11.82	--	--	747.23	0.06
	07/30/13	10.29	--	--	748.76	1.53
	10/29/13	10.92	--	--	748.13	-0.63
	02/13/14	12.11	--	--	746.94	-1.19
	04/24/14	11.65	--	--	747.40	0.46
	07/23/14	10.27	--	--	748.78	1.38
	10/22/14	10.32	--	--	748.73	-0.05
	03/03/15	11.84	--	--	747.21	-1.52
	05/20/15	10.89	--	--	748.16	0.95
MW-4	02/01/11	11.25	--	--	747.34	--
758.59	05/18/11	10.64	--	--	747.95	0.61
	02/28/12	11.51	--	--	747.08	-0.87
	07/18/12	9.77	--	--	748.82	1.74
	10/23/12	10.13	--	--	748.46	-0.36
	01/29/13	11.31	--	--	747.28	-1.18
	05/01/13	11.28	--	--	747.31	0.03
	07/30/13	9.75	--	--	748.84	1.53
	10/29/13	10.34	--	--	748.25	-0.59
	02/13/14	11.52	--	--	747.07	-1.18
	04/24/14	11.11	--	--	747.48	0.41
	07/23/14	9.72	--	--	748.87	1.39
	10/22/14	9.76	--	--	748.83	-0.04
	03/03/15	11.30	--	--	747.29	-1.54
	05/20/15	10.35	--	--	748.24	0.95
MW-5	02/01/11	12.34	--	--	746.96	--
759.3	05/18/11	11.74	--	--	747.56	0.60
	02/28/12	12.49	--	--	746.81	-0.75
	07/18/12	10.56	--	--	748.74	1.93
	10/23/12	10.96	--	--	748.34	-0.40
	01/29/13	12.35	--	--	746.95	-1.39
	05/01/13	12.31	--	--	746.99	0.04
	07/30/13	10.53	--	--	748.77	1.78
	10/29/13	11.14	--	--	748.16	-0.61
	02/13/14	12.52	--	--	746.78	-1.38
	04/24/14	12.11	--	--	747.19	0.41
	07/23/14	10.52	--	--	748.78	1.59
	10/22/14	10.58	--	--	748.72	-0.06
	03/03/15	12.20	--	--	747.10	-1.62
	05/20/15	11.10	--	--	748.20	1.10
MW-6	02/01/11	11.19	--	--	746.68	--
757.87	05/18/11	10.54	--	--	747.33	0.65
	02/28/12	11.38	--	--	746.49	-0.84
	07/18/12	9.65	--	--	748.22	1.73
	10/23/12	10.07	--	--	747.80	-0.42
	01/29/13	11.20	--	--	746.67	-1.13
	05/01/13	11.14	--	--	746.73	0.06
	07/30/13	9.68	--	--	748.19	1.46
	10/29/13	10.29	--	--	747.58	-0.61
	02/13/14	11.37	--	--	746.50	-1.08
	04/24/14	10.96	--	--	746.91	0.41
	07/23/14	9.62	--	--	748.25	1.34
	10/22/14	9.68	--	--	748.19	-0.06
	03/03/15	11.17	--	--	746.70	-1.49
	05/20/15	10.21	--	--	747.66	0.96
MW-7	02/01/11	12.08	--	--	746.83	--
758.91	05/18/11	11.54	--	--	747.37	0.54
	02/28/12	12.25	--	--	746.66	-0.71
	07/18/12	10.59	--	--	748.32	1.66
	10/23/12	10.98	--	--	747.93	-0.39
	01/29/13	12.09	--	--	746.82	-1.11
	05/01/13	12.05	--	--	746.86	0.04
	07/30/13	10.58	--	--	748.33	1.47
	10/29/13	11.19	--	--	747.72	-0.61
	02/13/14	12.28	--	--	746.63	-1.09
	04/24/14	11.85	--	--	747.06	0.43
	07/23/14	10.50	--	--	748.41	1.35
	10/22/14	10.55	--	--	748.36	-0.05
	03/03/15	12.08	--	--	746.83	-1.53
	05/20/15	11.13	--	--	747.78	0.95

Table 1 - Summary of Groundwater Elevations
Former Smitty Conoco #140 (Former Spirit Gas Station)
Toppenish, Washington

Well Number/ TOC Elevation (feet)	Date of Measurement	Depth to Water (feet)	Depth to Liquid Phase Hydrocarbons (feet)	Thickness Liquid Phase Hydrocarbons (feet)	Groundwater Elevation (feet)	Change in Groundwater Elevation (feet)
MW-8	02/01/11	11.58	--	--	746.82	--
758.4	05/18/11	11.05	--	--	747.35	0.53
	02/28/12	11.78	--	--	746.62	-0.73
	07/18/12	10.14	--	--	748.26	1.64
	10/23/12	10.56	--	--	747.84	-0.42
	01/29/13	11.64	--	--	746.76	-1.08
	05/01/13	11.60	--	--	746.80	0.04
	07/30/13	10.12	--	--	748.28	1.48
	10/29/13	10.76	--	--	747.64	-0.64
	02/13/14	11.82	--	--	746.58	-1.06
	04/24/14	11.41	--	--	746.99	0.41
	07/23/14	10.04	--	--	748.36	1.37
	10/22/14	10.16	--	--	748.24	-0.12
	03/03/15	11.60	--	--	746.80	-1.44
	05/20/15	10.69	--	--	747.71	0.91
MW-9	02/01/11	11.34	--	--	746.62	--
757.96	05/18/11	10.68	--	--	747.28	0.66
	02/28/12	11.42	--	--	746.54	-0.74
	07/18/12	9.79	--	--	748.17	1.63
	10/23/12	10.22	--	--	747.74	-0.43
	1//29/13	11.29	--	--	746.67	-1.07
	05/01/13	11.23	--	--	746.73	0.06
	07/30/13	9.80	--	--	748.16	1.43
	10/29/13	10.41	--	--	747.55	-0.61
	02/13/14	11.45	--	--	746.51	-1.04
	04/24/14	11.04	--	--	746.92	0.41
	07/23/14	9.71	--	--	748.25	1.33
	10/22/14	--	--	--	--	--
	03/03/15	11.22	--	--	746.74	-1.51
	05/20/15	10.33	--	--	747.63	0.89
MW-10	02/01/11	11.68	--	--	746.52	
758.20	05/18/11	11.09	--	--	747.11	0.59
	02/28/12	11.84	--	--	746.36	-0.75
	07/18/12	10.21	--	--	747.99	1.63
	10/23/12	10.62	--	--	747.58	-0.41
	1//29/13	11.70	--	--	746.50	-1.08
	05/01/13	11.64	--	--	746.56	0.06
	07/30/13	10.22	--	--	747.98	1.42
	10/29/13	11.84	--	--	746.36	-1.62
	02/13/14	11.87	--	--	746.33	-0.03
	04/24/14	11.47	--	--	746.73	0.40
	07/23/14	10.15	--	--	748.05	1.32
	10/22/14	10.25	--	--	747.95	-0.10
	03/03/15	11.64	--	--	746.56	-1.39
	05/20/15	10.73	--	--	747.47	0.91
MW-11	03/03/15	11.76	--	--	747.56	--
759.32	05/20/15	10.78	--	--	748.54	0.98
MW-12	03/03/15	11.59	--	--	747.67	--
759.26	05/20/15	10.61	--	--	748.65	0.98
MW-13	03/03/15	11.40	--	--	747.33	--
758.73	05/20/15	10.41	--	--	748.32	0.99
MW-14	03/03/15	12.16	--	--	746.87	--
759.03	05/20/15	11.24	--	--	747.79	0.92
MW-15	03/03/15	11.44	--	--	747.36	--
758.80	05/20/15	10.44	--	--	748.36	1.00
MW-16	03/03/15	12.84	--	--	746.80	--
759.64	05/20/15	11.94	--	--	747.70	0.90
MW-17	03/03/15	12.46	--	--	747.36	--
759.82	05/20/15	11.47	--	--	748.35	0.99

Notes:
TOC = Top of casing elevation relative to assigned benchmark.
-- = Not applicable

Table 2 - Summary of Groundwater Analytical Results
Former Smitty Conoco #140 (Former Spirit Gas Station)
Toppenish, WA

Well Number	Date Sampled	Gasoline TPH (ug/L)	Volatile Organic Compounds (µg/l)								Total Lead (ug/L)	Dissolved Lead (µ/L)	Diesel TPH Extended (ug/L)			Metals (mg/L)					
			Benzene	Toluene	Ethylbenzene	Total Xylenes	EDC	EDB	Total Naphthalenes	MTBE			Diesel	Heavy Oil	Mineral Oil	Dissolved Iron	Disolved Manganese	Iron	Manganese	Nitrate	Sulfate
MW-1	7/19/2005	23,000	24	<1.0	200	1,300	--	--	--	--	15	--	<200	<400	--	--	--	--	--	--	--
	8/22/2006	12,000	50	16	92	460	--	--	--	--	--	--	<200	<400	--	--	--	--	--	--	--
	10/9/2007	4,900	45	<1.0	35	94	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/8/2009	657	64.4	21.7	<1.0	39.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/13/2009		58	2.6	23	9.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/1/2011	<100	<1.0	<1.0	2.2	7.2	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	5/18/2011	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	2/18/2012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	7/18/2012	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/23/2012	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/29/2013	839	1.5	<2.0	<1.0	5.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/1/2013	1,130	<1.0	<2.0	1.33	2.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/30/2013	<100	<1.0	<2.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/29/2013	570	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/13/2014	270	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2014	130	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/23/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/22/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	<5.0	<5.0	<200	--	--	<0.015	0.093	0.384	0.171	0.78	12
	5/21/2015	243	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-2*	7/19/2005	39,000	220	290	180	1,200	--	--	--	--	--	--	<200	<400	--	--	--	--	--	--	--
	8/22/2006	40,000	42	96	34	269	--	--	--	--	--	--	<200	<400	--	--	--	--	--	--	--
	10/9/2007	45,000	25	31	36	275	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/8/2009	108	2.3	3.2	<1.0	5.8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/13/2009	--	14	10	31	130	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
																--	--	--	--	--	--
MW-3*	7/19/2005	39,000	1,400	2,600	430	4,700	--	--	--	--	--	--	<200	<400	--	--	--	--	--	--	--
	8/22/2006	40,000	2,400	4,800	420	4,100	--	--	--	--	--	--	<200	<400	--	--	--	--	--	--	--
	10/9/2007	45,000	730	2,900	630	6,300	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/8/2009	84,900	2,500	4,800	639	7,450	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/13/2009	--	1,500	3,600	440	4,100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
																--	--	--	--	--	--

Table 2 - Summary of Groundwater Analytical Results
Former Smitty Conoco #140 (Former Spirit Gas Station)
Toppenish, WA

Well Number	Date Sampled	Gasoline TPH (ug/L)	Volatile Organic Compounds (µg/l)								Total Lead (ug/L)	Dissolved Lead (µ/L)	Diesel TPH Extended (ug/L)			Metals (mg/L)					
			Benzene	Toluene	Ethylbenzene	Total Xylenes	EDC	EDB	Total Naphthalenes	MTBE			Diesel	Heavy Oil	Mineral Oil	Dissolved Iron	Disolved Manganese	Iron	Manganese	Nitrate	Sulfate
MW-4	2/1/2011	18,800	22.4	62.8	435	2,730	<1.0	<0.01	115	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	5/18/2011	6,880	13.9	15.9	<1.0	688	<1.0	<0.01	10.8	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	2/18/2012	19,500	25.3	38.2	119	1,060	<1.0	0.06	278	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	7/18/2012	21,500	45.2	37	292	1,690	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/23/2012	7,070	35.6	15.2	142	251	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/29/2013	24,700	44.0	43	397	1,100	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/1/2013	24,500	25.6	24	364	928	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/30/2013	13,000	11.0	5.2	<1.0	660	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/29/2013	30,400	17.0	29	570	1,430	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/13/2014	12,200	26.3	17.3	248	575.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2014	3,690	1.6	2.1	<1.0	112	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/23/2014	6,740	2.7	7.7	33	419	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/22/2014	9,230	2.0	7.0	193	744	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/4/2015	10,200	24	18	168	652	--	--	--	--	<5.0	<5.0	<200	--	--	2.18	0.71	2.43	0.724	0.12	10
	5/21/2015	3,870	2	4	80	162	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-5	2/1/2011	10,100	11.9	5.6	186	242	<1.0	<0.01	155	<5.0	<5.0	--	<200	<400	<400	--	--	--	--	--	--
	5/18/2011	1,790	<1.0	<1.0	<1.0	4.1	<1.0	<0.01	5.4	<5.0	8.2	--	<200	<400	<400	--	--	--	--	--	--
	2/18/2012	2,010	1.8	3.8	2.4	4.3	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	7/18/2012	180	1.2	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/23/2012	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/29/2013	3,100	8.4	<2.0	21	37	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/1/2013	3,050	0.9	<2.0	1.89	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/30/2013	<100	<1.0	<2.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/29/2013	540	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/13/2014	602	1.8	<2.0	1.6	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2014	709	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/23/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/22/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/4/2015	329	<1.0	<2.0	<1.0	<2.0	--	--	--	--	<5.0	<5.0	<200	--	--	0.221	0.609	0.508	0.649	0.62	47.3
	5/21/2015	151	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2 - Summary of Groundwater Analytical Results
Former Smitty Conoco #140 (Former Spirit Gas Station)
Toppenish, WA

Well Number	Date Sampled	Gasoline TPH (ug/L)	Volatile Organic Compounds (µg/l)								Total Lead (ug/L)	Dissolved Lead (µ/L)	Diesel TPH Extended (ug/L)			Metals (mg/L)					
			Benzene	Toluene	Ethylbenzene	Total Xylenes	EDC	EDB	Total Naphthalenes	MTBE			Diesel	Heavy Oil	Mineral Oil	Dissolved Iron	Disolved Manganese	Iron	Manganese	Nitrate	Sulfate
MW-6	2/1/2011	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	5/18/2011	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	2/18/2012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	7/18/2012	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/23/2012	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/29/2013	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/1/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/30/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/29/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/13/2014	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/23/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/22/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	**3.6**	--
	5/21/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-7	2/1/2011	**42,300**	**215.0**	**692**	**1,570**	**11,500**	<1.0	<0.01	**311**	<5.0	**7.9**	--	<200	<400	<400	--	--	--	--	--	--
	5/18/2011	**68,200**	**90.5**	**120**	**411**	**15,500**	<1.0	<0.01	**1,540**	<5.0	**11.5**	--	<200	<400	<400	--	--	--	--	--	--
	2/18/2012	**38,600**	**61.5**	**53.8**	**234**	**6,760**	<1.0	<0.01	**364**	<5.0	**26.7**	--	--	--	--	--	--	--	--	--	--
	7/18/2012	**37,100**	**124.0**	**165**	**626**	**9,370**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/23/2012	**59,700**	**293.0**	**150**	**502**	**4,600**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/29/2013	**65,700**	**84.0**	**140**	**478**	**5,730**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/1/2013	**68,800**	**23.0**	**31**	**323**	**1,790**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/30/2013	**56,000**	**22.0**	**36**	**43**	**5,100**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/29/2013	**29,000**	**14.0**	**34**	**350**	**2,420**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/13/2014	**21,800**	**16.9**	**38.5**	**71.6**	**2,660**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2014	**18,600**	**14.0**	**52**	**439**	**2,840**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/23/2014	**9,810**	**4.3**	**14**	**64**	**1,770**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/22/2014	**3,490**	<2.0	<2.0	**28**	**98**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/4/2015	**29,200**	**30**	**80.4**	**530**	**2,130**	--	--	--	--	<5.0	<5.0	<200	--	--	**8.27**	**2.3**	**10.5**	**2.35**	**0.03**	**30**
	5/21/2015	**26,300**	**4.6**	**54**	**578**	**2,950**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2 - Summary of Groundwater Analytical Results
Former Smitty Conoco #140 (Former Spirit Gas Station)
Toppenish, WA

Well Number	Date Sampled	Gasoline TPH (ug/L)	Volatile Organic Compounds (µg/l)								Total Lead (ug/L)	Dissolved Lead (µ/L)	Diesel TPH Extended (ug/L)			Metals (mg/L)					
			Benzene	Toluene	Ethylbenzene	Total Xylenes	EDC	EDB	Total Naphthalenes	MTBE			Diesel	Heavy Oil	Mineral Oil	Dissolved Iron	Disolved Manganese	Iron	Manganese	Nitrate	Sulfate
MW-8	2/1/2011	**1,440**	<1.0	**2.2**	**18.6**	**164**	<1.0	<0.01	**35**	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	5/18/2011	<100	<1.0	**1.4**	<1.0	**4.8**	<1.0	<0.01	**16.8**	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	2/18/2012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	**43.2**	--	--	--	--	--	--	--	--	--	--
	7/18/2012	**380**	**1.4**	**2.1**	<1.0	**39.9**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/23/2012	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/29/2013	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/1/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/30/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/29/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/13/2014	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/23/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/22/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	**3.2**	--
	5/21/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-9	2/1/2011	**660**	**9.0**	<1.0	**9.2**	**24.7**	<1.0	<0.01	<5.0	<5.0	**8.6**	--	--	--	--	--	--	--	--	--	--
	5/18/2011	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	2/18/2012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	7/18/2012	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/23/2012	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/29/2013	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/1/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/30/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/29/2013	**190**	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/13/2014	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/23/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/22/2014	Did not sample									--	--	--	--	--	--	--	--	--	--	--
	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	**3.1**	--
	5/21/2015	**162**	<1.0	<2.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2 - Summary of Groundwater Analytical Results
Former Smitty Conoco #140 (Former Spirit Gas Station)
Toppenish, WA

Well Number	Date Sampled	Gasoline TPH (ug/L)	Volatile Organic Compounds (µg/l)								Total Lead (ug/L)	Dissolved Lead (µ/L)	Diesel TPH Extended (ug/L)			Metals (mg/L)					
			Benzene	Toluene	Ethylbenzene	Total Xylenes	EDC	EDB	Total Naphthalenes	MTBE			Diesel	Heavy Oil	Mineral Oil	Dissolved Iron	Disolved Manganese	Iron	Manganese	Nitrate	Sulfate
MW-10	2/1/2011	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	5/18/2011	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	2/18/2012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	<5.0	--	--	--	--	--	--	--	--	--	--
	7/18/2012	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/23/2012	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/29/2013	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/1/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/30/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/29/2013	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/13/2014	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/24/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	7/23/2014	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	10/22/2014	Did not sample									--	--	--	--	--	--	--	--	--	--	--
	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	**1.4**	--
	5/21/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-11	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	<5.0	<5.0	<200	--	--	<0.015	<0.002	<0.015	<0.002	**3.2**	**12**
	5/21/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-12	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	<5.0	<5.0	<200	--	--	<0.015	<0.002	<0.015	**0.003**	**3.4**	**11**
	5/21/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-13	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	<5.0	<5.0	<200	--	--	<0.015	<0.002	**0.065**	**0.014**	**3.9**	**13**
	5/21/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-14	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	<5.0	<5.0	<200	--	--	<0.015	<0.002	<0.015	<0.015	**3.2**	**11**
	5/21/2015	**707**	<1.0	<2.0	<1.0	**4.2**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-15	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	<5.0	<5.0	<200	--	--	<0.015	**0.184**	<0.015	**0.198**	**2**	**14**
	5/21/2015	**147**	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2 - Summary of Groundwater Analytical Results
Former Smitty Conoco #140 (Former Spirit Gas Station)
Toppenish, WA

Well Number	Date Sampled	Gasoline TPH (ug/L)	Volatile Organic Compounds (µg/l)								Total Lead (ug/L)	Dissolved Lead (µ/L)	Diesel TPH Extended (ug/L)			Metals (mg/L)					
			Benzene	Toluene	Ethylbenzene	Total Xylenes	EDC	EDB	Total Naphthalenes	MTBE			Diesel	Heavy Oil	Mineral Oil	Dissolved Iron	Disolved Manganese	Iron	Manganese	Nitrate	Sulfate
MW-16	3/4/2015	**627**	**3.8**	<2.0	**1.9**	**2.4**	--	--	--	--	<5.0	<5.0	<200	--	--	**1.89**	**1.04**	**3.14**	**1.08**	**1.7**	**19**
	5/21/2015	**566**	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	**--**	**--**	**--**	**--**	**--**	**--**
MW-17	3/4/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	<5.0	<5.0	<200	--	--	<0.015	<0.002	<0.015	<0.002	**3.9**	**12**
	5/21/2015	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	**--**
PQL		100	1.0	1.0 or 2.0	1.0	1.0 or 2.0 or 3.0	1.0	0.01	5.0	5.0	5.0	5.0	200	400	400	<0.015	<0.002	<0.015	<0.002	--	<2.0
Ecology MTCA Method A Clean Up Levels		800 **	5	1,000	700	1,000	5	0.010	160	20	15	--	500	500	500	--	--	--	--	--	--

Notes:
EDC = 1,2-Dichloroethane
EDB = 1,2-Dibromoethane
MTBE = methyl tertiary-butyl ether
MTCA = Model Toxics Control Act
ug/L= micrograms per liter
-- Not analyzed for constituent
< Not detected at the listed laboratory detection limits
PQL = Practical Quantification Limit (laboratory detection limit)
* Monitoring wells decommissioned in 2009 due to UST removal/soil excavation activities.
** Groundwater results from White Shield, Inc.'s and US EPA's sampling activities.
Red Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level
Bold indicates the detected concentration is below Ecology MTCA Method A cleanup levels

Table 3 - Summary of Soil Analytical Results Off Property Borings

Former Smitty Conoco #140
Toppenish, WA

Sample Number[1]	Date Sampled	Depth Sampled (feet)	Gasoline TPH[2] (mg/Kg)	Select Volatile Organic Compounds[3] (mg/Kg)				Diesel Extended TPH[4] (mg/Kg)			HCID[5] (mg/Kg)			
				Benzene	Toluene	Ethyl-benzene	Total Xylenes	Diesel	Heavy Oil	Mineral Oil	Gasoline	Diesel	Heavy Oil	Mineral Oil
B1-S3-12.0	7/13/2010	12.0	***108***	***0.15***	**0.15**	**0.71**	**0.23**	<25	<40	<40	--	--	--	--
B2-S3-11.5	7/13/2010	11.5	<10	<0.02	<0.10	<0.05	<0.15	<25	<40	<40	--	--	--	--
B3-S3-11.5	7/13/2010	11.5	<10	<0.02	<0.10	<0.05	<0.15	<25	<40	<40	--	--	--	--
B4-S2-7.0	7/13/2010	7.0	--	<0.02	<0.10	<0.05	<0.15	--	--	--	<20	<50	<100	<100
B5-S4-15.0	7/13/2010	15.0	<10	<0.02	<0.10	<0.05	<0.15	<25	<40	<40	--	--	--	--
B6-S3-12.0	7/13/2010	12.0	<10	<0.02	<0.10	<0.05	<0.15	<25	<40	<40	--	--	--	--
B7-S4-15.0	7/13/2010	15.0	--	<0.02	<0.10	<0.05	<0.15	--	--	--	<20	<50	<100	<100
B8-S4-15.0	7/13/2010	15.0	**14**	***0.025***	<0.10	**0.08**	**0.2**	<25	<40	<40	--	--	--	--
B9-S3-12.0	7/13/2010	12.0	***2,340***	***0.24***	**0.71**	***13.3***	***82.9***	<25	<40	<40	--	--	--	--
B10-S4-13.0	7/13/2010	13.0	***821***	***0.031***	**0.16**	**0.97**	**1.75**	--	--	--	--	--	--	--
B11-S4-15.0	7/13/2010	15.0	<10	<0.02	<0.10	<0.05	<0.15	--	--	--	--	--	--	--
B12-S4-13.0	7/13/2010	13.0	<10	<0.02	<0.10	<0.05	<0.15	--	--	--	--	--	--	--
PQL			10	0.02	0.10	0.05	0.15	25	40	40	20	50	100	100
Ecology MTCA Method A Clean Up Levels			30 [6]	0.03	7	6	9	2,000	2,000	4,000	100	2,000	2,000	4,000

Notes:
[1]Approximate sample locations are shown in figure 2
[2]Gasoline range total petroleum hydrocarbons (TPH). Analyzed by NWTPH-Gx
[3]Select Volatile Organic Compounds. Analyzed by EPA Method 8021B
[4] Diesel extended range TPH. Analyzed by Northwest Method NWTPH-D/Dx
[5] Hydrocarbon Identification (HCID). Analyzed by Northwest Method NWTPH-HCID
[6]Cleanup level with presence of benzene
mg/Kg = milligrams per kilograms
PQL= practical quantitation l
-- = not analyzed for this constituent
< = not detected above laboratory limits
* Ecology has not designated a cleanup level for this constituent
Bold red indicates the detected concentration exceeds Ecology MTCA Method A cleanup level

Table 4 - Summary of Off Property Boring Groundwater Analytical Data

Former Smitty Conoco #140
Toppenish, WA

Sample Number	Date Sampled	Gasoline TPH[2] (µg/L)	Select Volatile Organic Compounds[3] (µg/L)				Diesel Extended TPH[4] (µg/L)			HCID[5] (µg/L)			
			Benzene	Toluene	Ethyl-benzene	Total Xylenes	Diesel	Heavy Oil	Mineral Oil	Gasoline	Diesel	Heavy Oil	Mineral Oil
B1-W	7/14/2010	**31,600**	**49**	**66.5**	**560**	**397**	<200	<400	<400	--	--	--	--
B2-W	7/14/2010	<100	<1	<2	<1	<3	<200	<400	<400	--	--	--	--
B3-W	7/14/2010	<100	<1	<2	<1	<3	<200	<400	<400	--	--	--	--
B4-W	7/14/2010	--	--	--	--	--	--	--	--	<200	<500	<500	<500
B5-W	7/14/2010	<100	<1	<2	<1	<3	<200	<400	<400	--	--	--	--
B6-W	7/14/2010	<100	<1	<2	<1	<3	<200	<400	<400	--	--	--	--
B7-W	7/14/2010	--	--	--	--	--	--	--	--	<200	<500	<500	<500
B8-W	7/14/2010	**21,400**	**155**	**75**	**205**	**458**	<200	<400	<400	--	--	--	--
B9-W	7/14/2010	**148,000**	**322**	**442**	**1,390**	**11,300**	<200	<400	<400	--	--	--	--
B10-W	7/14/2010	**821**	<1	<2	**2.9**	**4.7**	<200	<400	<400	--	--	--	--
B11-W	7/14/2010	<100	<1	<2	<1	<3	<200	<400	<400	--	--	--	--
B12-W	7/14/2010	**287**	<1	<2	<1	**4.7**	<200	<400	<400	--	--	--	--
PQL		100	1	2	1	3	200	400	400	200	500	500	500
MTCA Method A Clean Up Levels		800 [6]	5	1,000	700	1,000	500	500	500	1,000	500	500	500

Notes:
[2]Gasoline range total petroleum hydrocarbons (TPH). Analyzed by Northwest Method NWTPH-Gx
[3]Select Volatile Organic Compounds. Analyzed by EPA Method 8021B
[4] Diesel extended range TPH. Analyzed by Northwest Method NWTPH-D/Dx
[5] Hydrocarbon Identification (HCID). Analyzed by Northwest Method NWTPH-HCID
[6]Cleanup level with presence of benzene
Bold red indicates the detected concentration exceeds Ecology MTCA Method A cleanup level
Bold font indicates the concentration is below MTCA Method A cleanup levels

PQL= practical quantitation limit
< = not detected above laboratory limits
-- = Not analyzed for this constituent
(µg/l) = micrograms per liter

Table 5 - Summary of Soil Analytical Results SSC February 2015

Smitty's Toppenish
Topppenish, Washington

Sample Number	Depth Collected (feet)	Date Collected	BTEX (mg/kg)				Total Petroleum Hydrocarbons (TPH) (mg/kg)		Metals (mg/Kg)		
			Benzene	Toluene	Ethylbenzene	Xylenes	Gasoline	Diesel	Sulfate	Total Iron	Total Manganese
Soil Borings											
B13-S1-10	10.0	2/10/2014	<0.02	<0.10	<0.05	**0.25**	**10**	<50	<200*	22,000	306
B13-S2-16.5	16.5	2/10/2014	<0.02	<0010	<0.05	<0.15	**19**	<50	<200*	22,200	338
B13-S3-20	20.0	2/10/2014	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	26,100	283
B13-S4-25	25.0	2/10/2014	<0.02	**0.15**	**0.25**	**0.15**	**66**	<50	<200*	17,000	204
B13-S5-30	30.0	2/10/2014	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	26,600	434
B14-S1-13(15)	10*	2/10/2014	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	29,400	417
B14-S2-18(20)	14*	2/10/2014	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	23,500	467
B14-S3-22	15*	2/10/2014	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	28,200	442
B14-S4-25	17*	2/10/2014	<0.02	<0.10	<0.05	<0.15	**106**	<50	<200*	24,000	413
B15-S1-16.0	11*	2/11/2015	<0.02	<0.10	**0.12**	**0.58**	**12**	<50	<200*	22,200	254
B15-S2-18	13*	2/11/2015	**<0.08**	**<0.40**	**3.92**	**30.1**	**1,810 E**	**115**	<200*	20,200	276
B15-S3-21	14*	2/11/2015	**<0.50**	**<2.5**	**48**	**296**	**9,670 E**	**610**	<200*	20,700	222
B16-S1-18	13*	2/11/2015	<0.02	<0.10	**0.14**	**0.59**	<10	<50	<200*	20,200	236
B16-S2-19	13*	2/11/2015	**<0.50**	**<2.5**	**76.7**	**401**	**7,150**	**2,340**	<200*	18,400	178
B16-S3-25	17*	2/11/2015	<0.02	<0.10	**0.13**	**0.66**	**80**	**96**	<200*	22,300	363
B17-S1-22	15*	2/11/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	20,300	178
B17-S2-14	10*	2/11/2015	<0.02	<0.10	<0.05	**0.29**	<10	<50	<200*	23,600	267
B17-S3-18	13*	2/11/2015	**0.023**	<0.10	**0.17**	**0.45**	**45**	<50	1350	18,400	265
B18-S1-18	13*	2/12/2015	<0.02	<0.10	<0.05	**0.27**	**16**	<50	<200*	23,900	361
B-18-S3-20	14*	2/12/2015	<0.02	<0.10	**0.36**	**2.19**	**152**	<50	<200*	16,800	265
B18-S2-25	17*	2/12/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	23,300	246
Monitoring Wells											
MW11-S2-7.0	12.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	21,400	320
MW11-S3-12.0	12.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	21,600	370
MW11-S4-19.0	19.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	22,700	338
MW11-S5-22.0	22.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	19,100	355
MW11-S6-25.0	25.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	24,100	358
MW12-S3-12.0	12.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	22,400	364
MW12-S4-18.0	18.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	24,900	349
MW12-S5-20.0	20.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	21,400	235
MW12-S6-25.0	25.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	16,900	275
MW13-S1-10	10.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	24,200	427
MW13-S2-20	20.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	24,800	376
MW13-S3-25	25.0	2/9/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	27,200	360
MW14-S1-10	10.0	2/10/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	24,900	278
MW14-S2-16	16.0	2/10/2015	<0.02	<0.10	<0.05	**0.24**	**11**	<50	<200*	21,300	271
MW14-S3-18	18.0	2/10/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	20,900	220
MW14-S4-22	22.0	2/10/2015	<0.02	<0.10	<0.05	**0.15**	**11**	<50	<200*	24,000	241
MW15-S1-10	10.0	2/10/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	26,800	390
MW15-S2-18	18.0	2/10/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	21,400	239
MW15-S4-21	21.0	2/10/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	23,500	290
MW15-S5-25	25.0	2/10/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	33,400	516
MW16-S6-10	20.0	2/11/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	280	24,300	234
MW16-S3-15	15.0	2/11/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	30,100	307
MW16-S2-20	20.0	2/11/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	27,000	268
MW16-S5-26	26.0	2/11/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	27,700	409
MW17-S1-10	10.0	2/11/2015	<0.02	<0.10	<0.05	**0.17**	**62**	<50	<200*	25,500	347
MW17-S3-20	20.0	2/11/2015	<0.02	<0.10	<0.05	**0.16**	**13**	<50	<200*	23,000	324
MW17-S4-25	25.0	2/11/2015	<0.02	<0.10	<0.05	<0.15	<10	<50	<200*	22,200	449
PQL (mg/kg)			0.02	0.10	0.05	0.15	10	50			
MTCA Method A Cleanup Levels (mg/kg)			0.03	7	6	9	30/100**	2,000			

Notes:
* wells drilled at a 45 degree angle depths are true vertical depth as adjusted.
mg/kg = milligrams per kilogram
< Not detected at the listed laboratory detection limits
PQL = Practical Quantification Limit (laboratory detection limit)
Red Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level
Bold indicates the detected concentration is below Ecology MTCA Method A cleanup levels
"E" Reported result is an estimate because it exceeds the calibration range
"*"Elevated detection limit due to sample matrix interferences.

APPENDIX A

Legal Description and Previous Owners

605 11th Ave. SE, Suite 201 • Olympia, WA • 98501
Phone: 360-352-9835 • Fax: 360-352-8164 • Email: admin@aegwa.com

Deed and Sales History from Yakima County Assessor's Office

Deed Date	Type	Description	Grantor	Grantee	Sale Price	Excise Number	Deed Number
09/25/2001	Quit Claim	Quit Claim Deed	Smith		$0.00	339217	2120402325

Abbreviated Legal Description from Yakima County Assessor's Office

Property ID	Owner	Location Address	Abbreviated Legal Description
201003-34510	R h Smith Distributing Company Inc	102 E Toppenish Ave	TOPPENSIH LAND CO'S 1ST ADD. TOPPENISH: FR. LOTS 7,8, & 9 BLK 7 EXS 36.76 FT MEAS N OF SE COR OF LOT 10

APPENDIX B

Supporting Documents
Boring Logs 2010 – 2011; Boring Logs 2015

605 11TH AVE SE, SUITE 201 • OLYMPIA, WA • 98501-2363
Phone: 360.352.9835 • Fax: 360.352.8164 • Email: admin@aegwa.com

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-1	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Pea gravel and silty SAND with gravel to approximately 2 feet. (FILL)	SM				0925	N/A			N/A
	Gray-brown-black, dry, soft to medium stiff, silty CLAY; Asphalt odor.	CL			B1-S1-4.0	0935		0		
5	Gray-brown, dry, medium dense, silty, gravelly SAND to silty, sandy GRAVEL, fine to coarse grained sand, medium to large size gravel, angular to subangular.	SM/GW			B1-S2-8.0	0942		0	Not Observed	
10	At 12 feet: becomes moist to wet. Medium petroleum fuel odor. ▼ At 13 feet: becomes saturated. Strong petroleum fuel odor at 13 feet to 15 feet.				B1-S3-12.0	0950			Sheen	
15	At 15 feet: tough drilling. Refusal.									
	TD at 15 feet bgs. Refusal drilling. Groundwater encountered at ~12 feet bgs ATD. Installed temporary screen at 10 feet to 14 feet to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-2	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Dark brown - black/brown, dry, medium dense, silty SAND with gravel. (FILL)					1110	N/A			N/A
		SM			B2-S1-2.0	1115		0		
	Medium brown, moist, medium stiff, silty CLAY, medium plasticity. No petroleum fuel odor.	CL								
5										
					B2-S2-7.0	1121		0		
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to angular. No petroleum fuel odor.	GW								
10										
	At 11-1/2 feet: becomes moist to wet. At 12 feet: becomes saturated.	▼			B2-S3-11.5	1128		0	Not Observed	
	At 13 feet: 2 inch lense of well sorted sand, coarse gravel.									
15	At 15 feet: tough drilling. Refusal.				B2-S4-15.0	1133		0	Not Observed	
	TD at 15 feet bgs. Groundwater encountered at ~11-1/2 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-3	**PAGE** 1 OF 1	
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**			
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe		
Date:	7/13/2010	**Logged By:**	Y. Van		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Gray-black to black-brown, dry, loose to medium dense, silty SAND with gravel. (FILL)	SM			B3-S1-2.0	1150 1158	N/A	0		N/A
	Dark brown, dry, medium stiff, silty CLAY, low plasticity.	CL								
	At 4 feet: grades to medium brown, medium plasticity.									
5										
					B3-S2-6.5	1206		0		
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to	GW								
10										
	At 11-1/2 feet: becomes moist to wet. No petroleum fuel odor.	▼			B3-S3-11.5	1213		0	Not Observed	
	At 13 feet: becomes saturated									
15	At 15 feet: tough drilling. Refusal.				B3-S4-15.0			0	Not Observed	
	TD at 15 feet bgs. Groundwater encountered at ~11-1/2 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-4	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Gray-black to black-brown, dry, loose to medium dense, silty SAND with gravel. (FILL)	SM				1250	N/A			N/A
	Black-brown, dry, soft to medium stiff, silty CLAY, low plasticity.	CL								
	At 4 feet: becomes medium brown, moderate plasticity.				B1-S1-4.0	1257		0		
5										
					B4-S2-7.0	1304		0		
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse gravel, subangular to angular.	GW								
10										
	At 11-1/2 feet: becomes moist to wet. No petroleum fuel odor.	▼			B4-S3-12.0	1312		0	Not Observed	
	At 13 feet: becomes saturated.									
15	At 15 feet: tough drilling. Refusal.				B4-S4-15.0	1321		0	Not Observed	
	TD at 15 feet bgs. Groundwater encountered at ~11-1/2 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-5	**PAGE** 1 OF 1	
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**			
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe		
Date:	7/13/2010	**Logged By:**	Y. Van		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Gray, dry, loose to medium dense, silty SAND with gravel. (FILL)	SM				1400	N/A			N/A
	Medium to dark brown, dry, soft to medium stiff, silty CLAY. Low plasticity.	CL			B5-S1-4.0	1408		0		
5					B5-S2-7.0	1413		0.2		
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse gravel subangular to angular.	GW								
10										
	At 11-1/2 feet: becomes moist to wet. No petroleum fuel odor	▼			B5-S3-11.5	1421		0.3	Not Observed	
	At 14 feet: becomes saturated. Slight petroleum fuel odor at 15 feet. Drilling refusal .									
15					B5-S4-15.0	1425		0.6	Not Observed	
	TD at 15 feet bgs. Groundwater encountered at ~11-1/2 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-6	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Pea gravel and silty SAND with gravel. (FILL)	SM				1506	N/A			N/A
	Gray-black to dark brown, dry, soft to medium stiff, silty CLAY, low to medium plasticity.	CL			B6-S1-4.0	1511		0.2		
5										
	At 6-1/2 feet: 3 inch lense well sorted sand. Moist.				B6-S2-6.5	1518		0.3		
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size grave, subangular to angular.	GW								
10										
	At 11-1/2 feet: becomes moist to wet. No petroleum fuel odor	▼			B6-S3-12.0	1527		0.5	Not Observed	
	At 13 feet: 2 inch lense well sorted sand. Becomes									
15					B6-S4-15.0	1532			Not Observed	
	TD at 15 feet bgs. Groundwater encountered at ~11-1/2 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-7	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Pea gravel and silty SAND with gravel. (FILL)	SM				1550	N/A			N/A
	Light brown, dry, soft, sandy SILT/SILT, fine grained sand.	ML			B7-S1-4.0	1558		0		
5										
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to	GW			B7-S2-6.5	1604		0		
10										
	At 11-1/2 feet: becomes moist to wet. No petroleum fuel odor.	▼			B7-S3-11.5	1613		0.2	Not Observed	
	At 13 feet: becomes saturated.									
15	At 14 to 15 feet: Petroleum fuel odor. Drilling refusal.				B7-S4-15.0	1620		0.3	Not Observed	
	TD at 15 feet bgs. Groundwater encountered at ~11-1/2 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-8	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Dirt surface: Light brown, dry, medium dense, silty SAND with gravel.	SM				0840	N/A			N/A
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to angular.	GW			B8-S1-4.0	0846		0		
5										
	Medium brown, moist, medium stiff, silty CLAY to CLAY, medium plasticity.	CL			B8-S2-6.5	0852		0		
10										
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to angular.	GW ▼			B8-S3-12.0	0905		0	Not Observed	
	At 12 feet: becomes moist to wet. Slight to medium petroleum fuel odor.									
15	At 15 feet: strong fuel odor. Becomes saturated. Drilling				B8-S4-15.0	0950		Wet	Slight Sheen	
	TD at 15 feet bgs. Groundwater encountered at ~12 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-9	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Black-brown, dry, loose, silty SAND, local gravel, minor clay, (FILL)	SM				1001	N/A			N/A
	Dark brown-black, dry, soft to medium stiff, sandy CLAY, low to medium plasticity.	CL			B9-S1-4.0	1008		0		
5										
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to angular.	GW			B9-S2-7.5	1015		0		
10	At 10 feet: slight petroleum fuel odor									
	At 12 feet: becomes moist to wet. Moderate petroleum fuel odor. ▼				B9-S3-12.0	1021			Not Observed	
	At 14 feet: becomes saturated. Strong petroleum fuel odor.									
15	At 15 feet: drilling refusal.				B9-S4-15.0	1030			Slight Sheen	
	TD at 15 feet bgs. Groundwater encountered at ~12 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-10	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Pea gravel and silty SAND with gravel. (FILL)					1115	N/A			N/A
		SM			B10-S1-2.0	1122		0		
	Dark brown-black, dry, soft to medium stiff, silty CLAY, low plasticity.	CL								
5										
					B10-S2-7.0	1129		0		
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to angular.	GW								
10										
					B10-S3-12.0	1137		0		
	At 13 feet: becomes moist to wet. Slight petroleum fuel odor .	▼			B10-S4-13.0	1146			Not Observed	
15	At 15 feet: tough drilling. Refusal.									
	TD at 15 feet bgs. Groundwater encountered at ~13 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-11	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Pea gravel and silty SAND with gravel.	SM				1235	N/A			N/A
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to angular.	GW			B11-S1-4.0	1242		0		
5										
					B11-S2-8.0	1257		0		
10										
	At 12 feet: becomes moist to wet. ▼				B11-S3-12.0	1258		0	Not Observed	
15	At 15 feet: tough drilling. Refusal.				B11-S4-15.0	1306		0	Not Observed	
	TD at 15 feet bgs. Groundwater encountered at ~12 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish - Preliminary Offsite Investigation	**JOB #** 09-171	**BORING #** B-12	**PAGE** 1 OF 1
Location:	On Asotin Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Pacific NW Probe - Carlos Trujillo	**Drilling Method:**	Direct Push Probe	
Date:	7/13/2010	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt, 2 inch, underlain by Pea gravel and silty SAND with gravel. (FILL)	SM				1413	N/A			N/A
	Dark brown, dry, medium stiff, silty CLAY, low plasticity.	CL								
	At 4 feet: grades to medium brown, medium plasticity.				B12-S1-4.0	1421		0		
5										
					B12-S2-8.0	1430		0		
10										
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to	GW			B12-S3-10.5	1442		0		
	At 13 feet: becomes moist to wet. Medium petroleum fuel odor. ▼				B12-S4-13.0	1450			Not Observed	
15	At 15 feet: tough drilling. Refusal.									
	TD at 15 feet bgs. Groundwater encountered at ~13 feet bgs ATD. Installed temporary PVC screen at 10 feet to 15 feet to collect groundwater. Boring backfilled with bentonite chips.									
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ▼ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish Supplemental RI - 2nd Phase	**JOB #** 09-171	**BORING #** MW-4	**PAGE 1 OF 1**
Location:	102 East Toppenish Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Western States Drilling - Richard Wiggins	**Drilling Method:** CME 75 Hollow Stem Auger		
Date:	1/24/2011	**Logged By:** D. Brentlinger		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt and roadway, 0 to 18 inches, underlain by Gray-brown, dry, silty CLAY.	CL				0925				
5					MW4-S1-3.0-5.0	0945	14/23/28/29	0.9	Not Observed	
	Gray-brown, moist, very dense, sandy GRAVEL, subrounded gravel	GW								
10	At 10 feet: grades to brown-black. Sheen observed on soil sample.				MW4-S2-8.0-10.0	1015	28/35/48/48	419	Sheen Observed	
	Strong petroleum odor in soil continued to ~ 12 feet bgs..				MW4-S3-10.0-12.0	1030	28/40/48/50		Sheen Observed	
	At 14 feet: becomes moist to wet.	▼								
15										
20										
	TD at 25 feet bgs. Groundwater encountered at approximately 14 feet bgs ATD. Boring completed as Monitoring Well MW-4. Well Schematics: Prepacked screen: 10 feet to 25 feet, 0.010-inch slot, 2 inches Sch 40 PVC. Colorado Silica Sand, 10 x 20: 8 feet to 25 feet. Bentonite chips: 2 feet to 8 feet. Cement grout: 0 feet to 2 feet. Ecology Well Tag No. APL-729									
25						1120				

Explanation

- 2.5-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish Supplemental RI - 2nd Phase	**JOB #** 09-171	**BORING #** MW-5	**PAGE 1 OF 1**
Location:	102 East Toppenish Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Western States Drilling - Richard Wiggins	**Drilling Method:** CME 75 Hollow Stem Auger		
Date:	1/27/2011	**Logged By:** D. Brentlinger		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt and roadway, 0 to 18 inches, underlain by Dark brown to black, moist, silty CLAY, slight plasticity.	CL				1300				
5	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to angular.	GW								
10										
	Brown, moist, very dense, sandy GRAVEL with cobbles. Strong petroleum fuel odor.	GW			MW5-S1-10.0-12.0	1400	23/23/23/23		Sheen Observed	
	At 14 feet: becomes moist to wet.	▼			MW5-S2-12.0-14.0	1430	23/33/38/45		Sheen Observed	
15										
20										
25	TD at 25 feet bgs. Groundwater encountered at approximately 14 feet bgs ATD. Boring completed as Monitoring Well MW-5. Well Schematics: Prepacked screen: 10 feet to 25 feet, 0.010-inch slot, 2 inches Sch 40 PVC. Colorado Silica Sand, 10 x 20: 8 feet to 25 feet. Bentonite chips: 2 feet to 8 feet. Cement grout: 0 feet to 2 feet. Ecology Well Tag No. APL-774					1530				

Explanation

- 2.5-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish Supplemental RI - 2nd Phase	**JOB #** 09-171	**BORING #** MW-6	**PAGE 1 OF 1**
Location:	102 East Toppenish Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Western States Drilling - Richard Wiggins	**Drilling Method:** CME 75 Hollow Stem Auger		
Date:	1/24/2011	**Logged By:** D. Brentlinger		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt and roadway, 0 to 18 inches, underlain by Brown, moist, silty SAND with coarse, well sorted angular gravel.	SM				1330				
5										
	Yellow-brown, moist, soft, silty CLAY. Slight plasticity.	CL			MW6-S1-5.0-7.0	1345	1/2/2/2		Not Observed	
10										
	Yellow to gray-brown, moist , very dense, sandy GRAVEL with cobbles, well sorted gravel, subrounded.	GW			MW6-S2-10.0-12.0	1400	22/3233/35		Not Observed	
	At 14 feet: becomes moist to wet.	▼			MW6-S3-12.0-14.0	1415	29/30/4026		Not Observed	
15										
20										
	TD at 25 feet bgs. Groundwater encountered at approximately 14 feet bgs ATD. Boring completed as Monitoring Well MW-6. Well Schematics: Prepacked screen: 10 feet to 25 feet, 0.010-inch slot, 2 inches Sch 40 PVC. Colorado Silica Sand, 10 x 20: 8 feet to 25 feet. Bentonite chips: 2 feet to 8 feet. Cement grout: 0 feet to 2 feet. Ecology Well Tag No. APL-770									
25						1530				

Explanation

- 2.5-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish Supplemental RI - 2nd Phase	**JOB #** 09-171	**BORING #** MW-7	**PAGE 1 OF 1**
Location:	102 East Toppenish Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Western States Drilling - Richard Wiggins	**Drilling Method:** CME 75 Hollow Stem Auger		
Date:	1/27/2011	**Logged By:** D. Brentlinger		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt and roadway, 0 to 18 inches, underlain by Yellow-brown, moist, silty CLAY, slight plasticity.	CL				0745				
5										
	Gray-brown, dry, medium dense to dense, silty, sandy GRAVEL, fine to coarse grained sand, fine to coarse size gravel, subangular to angular.	GW								
10										
	Grey-black, moist, very dense, sandy GRAVEL with cobbles, subrounded gravel.	GW								
	At 12 feet: petroleum odor				MW7-S1-10.0-12.0	0900	46/50/48/60	298	Sheen Observed	
	At 14 feet: becomes moist to wet. Sheen observed on soil sample	▼			MW7-S2-10.0-14.0	0915	50/5		Sheen Observed	
15										
20										
	TD at 25 feet bgs. Groundwater encountered at approximately 14 feet bgs ATD. Boring completed as Monitoring Well MW-7. Well Schematics: Prepacked screen: 10 feet to 25 feet, 0.010-inch slot, 2 inches Sch 40 PVC. Colorado Silica Sand, 10 x 20: 8 feet to 25 feet. Bentonite chips: 2 feet to 8 feet. Cement grout: 0 feet to 2 feet. Ecology Well Tag No. APL-790									
25						1230				

Explanation

- 2.5-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish Supplemental RI - 2nd Phase	**JOB #** 09-171	**BORING #** MW-8	**PAGE 1 OF 1**
Location:	102 East Toppenish Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Western States Drilling - Richard Wiggins	**Drilling Method:** CME 75 Hollow Stem Auger		
Date:	1/26/2011	**Logged By:** D. Brentlinger		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt and roadway, 0 to 18 inches, underlain by Yellow-brown, moist, silty, sandy CLAY, slight plasticity.	CL				0845				
5										
10										
	Grey-black, moist, very dense, sandy GRAVEL with cobbles, subround gravel.	GW			MW8-S1-10.0-12.0	0900	36/38/42/48		Not Observed	
	At 14 feet: becomes moist to wet.	▼			MW8-S2-12.0-14.0	0930	48/60/102		Not Observed	
15										
20										
	TD at 25 feet bgs. Groundwater encountered at approximately 14 feet bgs ATD. Boring completed as Monitoring Well MW-8. Well Schematics: Prepacked screen: 10 feet to 25 feet, 0.010-inch slot, 2 inches Sch 40 PVC. Colorado Silica Sand, 10 x 20: 8 feet to 25 feet. Bentonite chips: 2 feet to 8 feet. Cement grout: 0 feet to 2 feet. Ecology Well Tag No. APL-778					1145				
25										

Explanation

- 2.5-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish Supplemental RI - 2nd Phase	**JOB #** 09-171	**BORING #** MW-9	**PAGE 1 OF 1**
Location:	102 East Toppenish Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Western States Drilling - Richard Wiggins	**Drilling Method:** CME 75 Hollow Stem Auger		
Date:	1/25/2011	**Logged By:** D. Brentlinger		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt and roadway, 0 to 18 inches. Underlain dark brown, moist, silty, sandy CLAY	CL				1300				
5										
	Yellow-brown, moist, dense, silty CLAY with cobbles and gravel.	CL								
10										
	Grey-black, moist to wet, very dense, sandy GRAVEL with cobbles, subrounded gravel.	GW			MW9-S1-10.0-12.0	1330	13/14/22/27		Not Observed	
	At 14 feet: becomes moist to wet.	▼			MW9-S2-12.0-14.0	1345	43/48/60/52		Not Observed	
15										
20										
	TD at 25 feet bgs. Groundwater encountered at approximately 14 feet bgs ATD. Boring completed as Monitoring Well MW-9. Well Schematics: Prepacked screen: 10 feet to 25 feet, 0.010-inch slot, 2 inches Sch 40 PVC. Colorado Silica Sand, 10 x 20: 8 feet to 25 feet. Bentonite chips: 2 feet to 8 feet. Cement grout: 0 feet to 2 feet. Ecology Well Tag No. APL-772					1615				
25										

Explanation

- 2.5-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Smitty's Toppenish Supplemental RI - 2nd Phase	**JOB #** 09-171	**BORING #** MW-10	**PAGE 1 OF 1**
Location:	102 East Toppenish Avenue, Toppenish, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	Western States Drilling - Richard Wiggins	**Drilling Method:** CME 75 Hollow Stem Auger		
Date:	1/25/2011	**Logged By:** D. Brentlinger		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt and roadway, 0 to 18 inches. (FILL) Underlain by dark brown, moist, medium stiff, silty, sandy CLAY	CL				0845				
5										
	Yellow-brown, moist to very moist, medium stiff, silty, sandy CLAY. Slight plasticity.	CL			MW10-S1-8.0-10.0	0850	3/7/17/24			
10	At 13 feet: strong petroleum fuel odor									
	Gray-black, wet, very dense, sandy GRAVEL with cobbles, subrounded gravels	GW			MW10-S2-12.0-14.0	0900	11/18/27/30			
15										
20										
	TD at 25 feet bgs. Groundwater encountered at approximately 14 feet bgs ATD. Boring completed as Monitoring Well MW-10. Well Schematics: Prepacked screen: 10 feet to 25 feet, 0.010-inch slot, 2 inches Sch. 40 PVC. Colorado Silica Sand, 10 x 20: 8 feet to 25 feet. Bentonite chips: 2 feet to 8 feet. Cement grout: 0 feet to 2 feet. Ecology Well Tag No. APL-771					1115				
25										

Explanation

- 2.5-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Smitty's Toppenish***	**JOB # *09-171***	**BORING # *B-13*** **PAGE 1 OF 2**
Location:	*102 East Toppenish Ave, Toppenish, Washington*	**Approximate Elevation:** 759 AML	
Subcontractor / Driller: Holt's Drilling/Brian		**Equipment / Drilling Method: Sonic Rig**	
Date:	*February 10, 2015*	**Logged By:** *B. Dilba*	

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Observations
	3" of asphalt underlain by;		1			8:27	N/A			
			2							
			3							
	Brown, moist, medium stiff, CLAYEY SILT	ML	4					3.1		
5			5							
			6					0.0		
			7							
			8							
	Light gray-brown, moist, dense, SANDY GRAVEL; fine to coarse grain gravel, fine to coarse grain sand	GP	9							
10			10		B13-S1-10	8:38		0.0		
			11							
			12							
			13							
			14							
15			15							
		▽	16		B13-S2-16.5	8:50		8.4	No	
	at 16.5 feet; wet		17							
	at 17.0 feet; light gray (discolored)		18							Strong Odor
			19							
20			20		B13-S3-20	8:50		3.4		
			21							
			22							
			23							
			24							
25			25		B13-S4-25	9:00		1.5		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Smitty's Toppenish***	**JOB # *09-171*** **BORING # B-13**	**PAGE 2 OF 2**
Location:	*102 East Toppenish Ave, Toppenish, Washington*	**Approximate Elevation: 759 AML**	
Subcontractor / Driller: Holt's Drilling/Brian		**Equipment / Drilling Method: Sonic Rig**	
Date	*February 10, 2015*	**Logged By:** *B. Dilba*	

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Observations
	at 25.0 feet; brown		26							No odor
			27							
			28							
			29							
30			30		B13-S5-30	9:00		2.2		

Boring terminated at 30.0 feet; backfilled with bentonite and covered with an asphalt patch. Groundwater encountered at 16.5 feet

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Smitty's Toppenish***	**JOB # *09-171***	**BORING # *B-14*** **PAGE 1 OF 1**
Location:	*102 East Toppenish Ave, Toppenish, Washington*	**Approximate Elevation:** 759 AML	
Subcontractor / Driller: Holt's Drilling/Brian		**Equipment / Drilling Method: Sonic Rig**	
Date:	*February 10, 2015*	**Logged By:** *B. Dilba*	

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Observations
	3" of asphalt underlain by;		1			17:10	N/A			
	Brown, moist, stiff, CLAYEY SILT (TVD .707)	ML	2							
			3							
			4							
5	Brown, moist, medium dense, SANDY GRAVEL; fine to coarse gravel, fine to coarse sand (TVD 2.82)	GP	5							
			6							
			7							
			8			17:18		0		
			9							
10			10							
			11							
			12							
			13							
			14							
15			15		B14-S1-13(15)	17:18		0		
	TVD (10.605)		16							
			17							
			18			17:18				
			19							
20			20		B14-S2-18 (20)	17:42		0.3		
	TVD (14.14)		21							
			22		B14-S3-22	17:42		3.3		
	TVD (15.55)	▽	23						No	
	at 23.0 feet; wet, light gray (discolored) (TVD 16.26)		24							Hydrocarbon Odor
25	TVD (17.675)		25		B14-S4-25	17:42		26.6		↓

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Boring terminated at 25.0 feet (TVD 17.675) at a 45° angle; backfilled with bentonite with an asphalt patch.
Groundwater encountered at 16.26 feet TVD

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Smitty's Toppenish***	**JOB #** ***09-171***	**BORING #** ***B-15*** **PAGE 1 OF 1**
Location:	*102 East Toppenish Ave, Toppenish, Washington*	**Approximate Elevation:** 759 AML	
Subcontractor / Driller: Holt's Drilling/Brian		**Equipment / Drilling Method: Sonic Rig**	
Date:	*February 11, 2015*	**Logged By:** *B. Dilba*	

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Observations
	3" of asphalt underlain by;		1			11:25	N/A			
			2							
			3							
	Brown, moist, stiff, SANDY SILT; fine grained sand (TVD 2.121)	ML	4							
5			5							
			6							
			7							
			8			11:29		0.0		
			9							
10			10							
	Brown, moist, loose, SANDY GRAVEL; fine to coarse grain gravel, fine to coarse grain sand (TVD 7.07)	GP	11							
			12							
			13							
			14							
15			15							
			16		B15-S1-16	11:34				
	(TVD 11.312)		17							
	At 17.0 feet; light gray (discolored) (TVD 12.02)		18		B15-S1-18	11:34		43.6		Strong hydrocarbon odor
	(TVD 12.726)		19							
20		▽	20						Yes	
	at 20.0 feet; wet (TVD 14.14)		21		B15-S3-21	11:45		166		
	(TVD 14.847)		22							
			23							
			24							
25	at 24.5 feet; medium dense; medium grain sand (TVD 17.32)		25			11:45		4.8		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Boring terminated at 25.0 feet (TVD 17.675 feet) at a 45° angle; backfilled with bentonite and covered with a concrete patch. Groundwater encountered at 14.14 feet TVD.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Smitty's Toppenish***	**JOB # *09-171***	**BORING # *B-16*** **PAGE 1 OF 1**
Location:	*102 East Toppenish Ave, Toppenish, Washington*	**Approximate Elevation:** 759 AML	
Subcontractor / Driller: Holt's Drilling/Brian		**Equipment / Drilling Method: Sonic Rig**	
Date:	*February 11, 2015*	**Logged By:** *B. Dilba*	

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Observations
	3" of asphalt underlain by;		1			12:24	N/A			
			2							
			3							
			4							
5			5							
	Dark brown, moist, loose, SANDY SILT; fine grain sand (TVD 3.535)	ML	6							
	At 6.0 feet; brown (TVD 4.242)		7							
			8			12:29		0.0		
			9							
10			10							
			11							
			12							
			13							
			14							
15	Brown, dry, loose, SANDY GRAVEL; fine to coarse grain gravel, fine to coarse grain graveL (TVD 9.898)	GP	15							
			16							
			17							
			18		B16-S1-18	12:33		0.0		No odor
	(TVD 12.726)	▽	19		B16-S2-19	12:39		1223	Yes	Hydrocarbon Odor
20	at 19.0 feet; light gray (discolored), wet (TVD 13.433)		20							
			21							
			22							
			23							
			24							
25	at 24.0 feet; brown (TVD 16.968) (TVD 17.675)		25		B16-S3-25	12:39		6.9		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Boring terminated at 25.0 feet (TVD 17.675 feet) at a 45° angle; backfilled with bentonite and covered with a concrete patch. Groundwater encountered at 13.433 feet TVD.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Smitty's Toppenish***	**JOB # *09-171***	**BORING # *B-17*** **PAGE 1 OF 1**
Location:	*102 East Toppenish Ave, Toppenish, Washington*	**Approximate Elevation:** 759 AML	
Subcontractor / Driller: Holt's Drilling/Brian		**Equipment / Drilling Method: Sonic Rig**	
Date:	*February 11, 2015*	**Logged By:** *B. Dilba*	

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Observations
			1			15:12	N/A			
			2							
	Brown, moist, stiff, SANDY SILT; fine grain sand (TVD 1.414)	ML	3							
			4							
5			5							
	Dark brown, moist, loose, SANDY GRAVEL; fine to coarse grain gravel, fine to coarse grain sand (TVD 4.595)	GP	6							
	at 6.5 feet; gray (TVD 4.595)		7							
			8			15:18		0.0		
			9							
10			10							
			11							
	at 11.0 feet; brown (TVD 7.777)		12							
			13							
			14		B17-S2-14	15:25		0.0		
15	TVD 9.898		15							
			16							
			17							
			18		B17-S3-18	15:25		0.0		
	at 18.0 feet; dark brown, medium dense (TVD 12.726)		19							
20			20							
		▽	21							
	Gray, wet, loose, SAND; fine to medium grain sand (TVD 14.847)	SP	22		B17-S3-22	15:34		0.0	Yes	Odor
	(TVD 15.554)		23							
	Gray, wet, loose, SANDY GRAVEL; fine to coarse grain gravel, fine to coarse grain sand (TVD 16.261)	GP	24							
25			25			15:34		0.0		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Boring terminated at 25.0 feet (TVD 17.675 feet) at a 45° angle; backfilled with bentonite and covered with a concrete patch. Groundwater encountered at 14.847 feet TVD.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Smitty's Toppenish***	**JOB # *09-171***	**BORING # *B-18*** **PAGE 1 OF 1**
Location:	*102 East Toppenish Ave, Toppenish, Washington*	**Approximate Elevation:** 759 AML	
Subcontractor / Driller: Holt's Drilling/Brian		**Equipment / Drilling Method: Sonic Rig**	
Date:	*February 12, 2015*	**Logged By:** *B. Dilba*	

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Observations
			1			8:58	N/A			
			2							
			3							
	Dark brown, moist, loose, SANDY GRAVEL; fine to coarse grain sand, fine to medium grain gravel (TVD 2.121	GP	4							
5			5							
			6							
			7							
	at 7.0 feet; fine to coarse grain gravel (TVD 5.4439)		8			9:05				
	Brown, moist, stiff, SILT (TVD 6.363)	ML	9							
10			10							
			11							
			12							
			13							
			14							
15	Brown, moist, loose, SANDY GRAVEL; fine to coarse grain gravel, fine to coarse grain, sand (TVD 9.898)	GP	15							
			16							
			17							
			18		B18-S1-18	9:11		2.4		Hydrocarbon Odor
	(TVD 12.726)		19							
20		▽	20		B18-S2-20	9:22		80.3	Yes	
	at 20.0 feet; light gray (discolored), wet (TVD 14.14)		21							
			22							
			23							
			24							
25	Gray, wet, loose, GRAVELLY SAND; fine to coarse grain gravel, coarse grain sand (TVD 17.3215)	SP	25		B18-S2-25	9:22		0		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Boring terminated at 25.0 feet (TVD 17.675 feet) at a 45° angle; backfilled with bentonite and covered with a concrete patch. Groundwater encountered at 14.14 feet TVD.

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: ***Smitty's Toppenish***	**JOB # *09-171***	**Monitoring Well #** *MW-11*	**PAGE 1 OF 1**
Location: *102 East Toppenish Ave, Toppenish, WA*	**Approximate Elevation:** 759 AMSL		
Subcontractor / Driller: Holt's Services/ Brian	**Equipment / Drilling Method: Sonic Drill Rig**		
Date: *February 9, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Observations	PID Reading	Sheen	Monitoring Well Construction
	18" of concrete with rebar underlain by:					11:57				
	Dark brown, moist, stiff, CLAYEY SILT	ML						0.0		
5					MW11-S1-5	12:29		0.0		
	Gray, dry, dense, SANDY GRAVEL; fine to coarse sand, fine to coarse gravel	GP			MW11-S2-7	12:29		3.7		
10										
	at 12.0 feet; wet	▽			MW11-S3-12	12:29		0.9	No	
15										
20					MW11-S4-19	12:35		43.1		
					MW11-S5-22	12:35		0.9		
25					MW11-S6-25	12:40		0.0		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BIK 245

Boring terminated at 25.0 feet; converted to MW-11 with 15 feet of 0.01 PVC slotted screen set from 15.0 to 25.0 feet BGS, and 10 feet of blank PVC from 0.0 to 10.0

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Smitty's Toppenish***	**JOB # *09-171*** **Monitoring Well #** *MW-12*	**PAGE 1 OF 1**
Location:	*102 East Toppenish Ave, Toppenish, WA*	**Approximate Elevation:** 759 AMSL	
Subcontractor / Driller: Holt's Services/ Brian		**Equipment / Drilling Method: Sonic Drill Rig**	
Date:	*February 9, 2015*	**Logged By:** *B. Dilba*	

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Observations	PID Reading	Sheen	Monitoring Well Construction
	18" of concrete and rebar underlain by;					14:15				
	Brown, moist, stiff, CLAYEY SILT	ML								
5					MW12-S1-6	14:23		0		
	Gray, dry, dense, SANDY GRAVEL; fine to carse sand, fine to coarse gravel	GP								
					MW12-S2-9	14:23		0		
10										
	at 12.0 feet; wet	▽			MW12-S3-12	14:23		2.9	No	
15										
					MW12-S4-18	14:36		13.6		
20					MW12-S5-20	14:36		7.2		
						14:36		0.3		
25					MW12-S6-25	14:50		0.6		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD Groundwater level at time of drilling or date of measurement

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BIK 246

Boring terminated at 25.0 feet; converted to MW-12 with 15 feet of 0.01 PVC slotted screen set from 15.0 to 25.0 feet BGS, and 10 feet of blank PVC from 0.0 to 10.0

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Smitty's Toppenish*	**JOB # *09-171***	**Monitoring Well #** *MW-13*	**PAGE 1 OF 1**
Location: *102 East Toppenish Ave, Toppenish, WA*	**Approximate Elevation:** 759 AMSL		
Subcontractor / Driller: Holt's Services/Brian	**Equipment / Drilling Method: Sonic Drill Rig**		
Date: *February 9, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Observations	PID Reading	Sheen	Monitoring Well Construction
						16:20				
	Brown, moist, medium dense, SILTY SAND; fine to medium sand (Fill)	SM								
	Brown, moist, medium stiff, CLAYEY SILT	SP								
5						16:25		0.0		
	Gray, dry, dense, SANDY GRAVEL; fine to coarse grain sand, fine to coarse grain gravel	GP								
						16:25		0.0		
10					MW13-S1-10	16:25		0.0		
15										
		▽								
20					MW13-S2-20	16:37		0.0		
	at 20.0 feet; wet									
25					MW13-S3-25	16:50		12.5		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BIK 247

Boring terminated at 25.0 feet; converted to MW-13 with 15 feet of 0.01 PVC slotted screen set from 15.0 to 25.0 feet BGS, and 10 feet of blank PVC from 0.0 to 10.0

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Smitty's Toppenish*	**JOB # *09-171***	**Monitoring Well #** *MW-14*	**PAGE 1 OF 1**
Location: *102 East Toppenish Ave, Toppenish, WA*	**Approximate Elevation:** 759 AMSL		
Subcontractor / Driller: Holt's Services/Brian	**Equipment / Drilling Method: Sonic Drill Rig**		
Date: *February 10, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Observations	PID Reading	Sheen	Monitoring Well Construction
	3" of asphalt underlain by;					1015				
	Brown, moist, medium stiff, CLAYEY SILT	ML								
5	Gray, dry, dense, GRAVELLY SAND; fine to coarse grain sand, fine to coarse grain gravel	SP								
10	Gray, dry, medium dense, SANDY GRAVEL; fine to coarse grain gravel, fine to coarse grain sand	GP			MW14-S1-10	1035		1.4		
15					MW14-S2-16	1055				
	at 17.0 feet; light gray (discolored)				MW14-S3-18	1055	Strong hydrocarbon odor	169		
20	Brown, wet, medium stiff, SILTY GRAVEL; fine to coarse grain gravel	GM				1055			No	
	Brown, wet, medium dense, SANDY GRAVEL; fine to coarse grain gravel, fine to coarse grain sand	GP			MW14-S4-22	1105	No hydrocarbon odor	3.2		
25						1105		25.7		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BIK 248

Boring terminated at 25.0 feet; converted to MW-14 with 15 feet of 0.01 PVC slotted screen set from 15.0 to 25.0 feet BGS, and 10 feet of blank PVC from 0.0 to 10.0

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Smitty's Toppenish*	**JOB # *09-171***	**Monitoring Well #** *MW-15*	**PAGE 1 OF 1**
Location: *102 East Toppenish Ave, Toppenish, WA*	**Approximate Elevation:** 759 AMSL		
Subcontractor / Driller: Holt's Services/Brian	**Equipment / Drilling Method: Sonic Drill Rig**		
Date: *February 10, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Observations	PID Reading	Sheen	Monitoring Well Construction
	3" asphalt underlain by;									
	Brown, dry, soft, SILTY SAND; fine grain sand	SM				1453				
	Brown, dry, medium dense, SILTY GRAVEL; fine to medium grain gravel	GM								
5	Light gray, dry, loose, SANDY GRAVEL; fine to medium grain sand, fine to medium grain gravel	GP				1506		0.9		
	at 5.0 feet; brown at 5.5 feet; light gray									
	at 7.0 feet; brown, fine to coarse grain sand, fine to coarse grain gravel									
10					MW15-S1-10	1506		0		
	at 11.0 feet; wet									
	at 12.0 feet; cobbles	▽ ATD							No	
15							Slight hydrocarbon odor			
					MW15-S2-16	1520				
	at 17.0 feet; moist				MW15-S3-18	1520		88.6		
20					MW15-S4-20	1520		0.1		
	at 20.0 feet; wet							0.4		
	Brown, wet, loose, GRAVEL; fine to medium gravel									
	Brown, wet, medium dense, SANDY GRAVEL; fine to coarse grain sand, fine to coarse grain gravel									
25					MW15-S5-25	1533		0		

Explanation

- I — Sample Advance / Recovery
- ⊗ — No Recovery
- - - - — Contact located approximately
- ▽ ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BIK 249

Boring terminated at 25.0 feet; converted to MW-15 with 15 feet of 0.01 PVC slotted screen set from 15.0 to 25.0 feet BGS, and 10 feet of blank PVC from 0.0 to 10.0

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: ***Smitty's Toppenish***	**JOB # *09-171***	**Monitoring Well #** *MW-16*	**PAGE 1 OF 2**
Location: *102 East Toppenish Ave, Toppenish, WA*	**Approximate Elevation:** 759 AMSL		
Subcontractor / Driller: Holt's Services/Brian	**Equipment / Drilling Method: Sonic Drill Rig**		
Date: *February 11, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Observations	PID Reading	Sheen	Monitoring Well Construction
	3" asphalt underlain by;					850				
5	Brown, moist, loose, SILTY SAND; fine to medium grain sand (fill)	SM								
	Brown, moist, stiff, SANDY SILT; fine grain sand	ML								
10					MW16-S6-10	910		0.0		
	Brown, moist, loose, SANDY GRAVEL; fine to coarse grain sand, fine to coarse grain gravel	GP								
15					MW16-S3-15	925		7.9	No	
	at 15.5 feet; light gray (discolored), wet									
20					MW16-S2-20	925	Hydrocarbon odor	0.0		
25	at 24.0 feet; brown				MW16-S1-25	948		0.0		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (ATD)

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BIK 250

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Smitty's Toppenish***	**JOB # *09-171*** **Monitoring Well #** *MW-16*	**PAGE 2 OF 2**
Location:	*102 East Toppenish Ave, Toppenish, WA*	**Approximate Elevation: 759 AMSL**	
Subcontractor / Driller: Holt's Services/Brian		**Equipment / Drilling Method: Sonic Drill Rig**	
Date:	*February 11, 2015*	**Logged By:** *B. Dilba*	

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Observations	PID Reading	Sheen	Monitoring Well Construction
			26		MW16-S5-26	950		0.0		
	Brown, wet, dense, SAND; medium grain sand		27							
	Brown, wet, dense, SILTY GRAVEL; fine to coarse grain gravel		28							
			29							
30			30							
			31							
			32							
			33							
			34							
35			35							
			36							
			37							
			38							
			39							
40			40							
			41							
			42							
			43							
			44							
45			45							
			46							
			47							
			48							
			49							
50			50							

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4 inch bentonite chips
- Silica sand
- 2-inch diameter PVC blank casing
- 2-inch diameter PVC 0.010" slotted casing

Boring terminated at 25.0 feet; converted to MW-16 with 15 feet of 0.01 PVC slotted screen set from 15.0 to 25.0 feet BGS, and 10 feet of blank PVC from 0.0 to 10.0

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: ***Smitty's Toppenish***	**JOB # *09-171***	**Monitoring Well #** *MW-17*	**PAGE 1 OF 1**
Location: *102 East Toppenish Ave, Toppenish, WA*	**Approximate Elevation:** 759 AMSL		
Subcontractor / Driller: Holt's Services/Brian	**Equipment / Drilling Method: Sonic Drill Rig**		
Date: *February 11, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
	Brown, moist, medium dense, SILTY SAND; fine to medium sand	SM				1313				
5	Brown, moist, stiff, SANDY SILT; fine grain sand	ML								
	Gray, dry, loose, SANDY GRAVEL; fine to coarse grain sand, fine to coarse grain gravel	GP								
10					MW17-S1-10	1317		0.3		
									No	
15	at 15.0 feet; wet					1323		0.0	No	
20					MW17-S3-20	1323		0.0		
25					MW17-S4-25	1345		0.0		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (ATD)

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

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Boring terminated at 25.0 feet; converted to MW-17 with 15 feet of 0.01 PVC slotted screen set from 15.0 to 25.0 feet BGS, and 10 feet of blank PVC from 0.0 to 10.0